RAILROAD GAZETTE

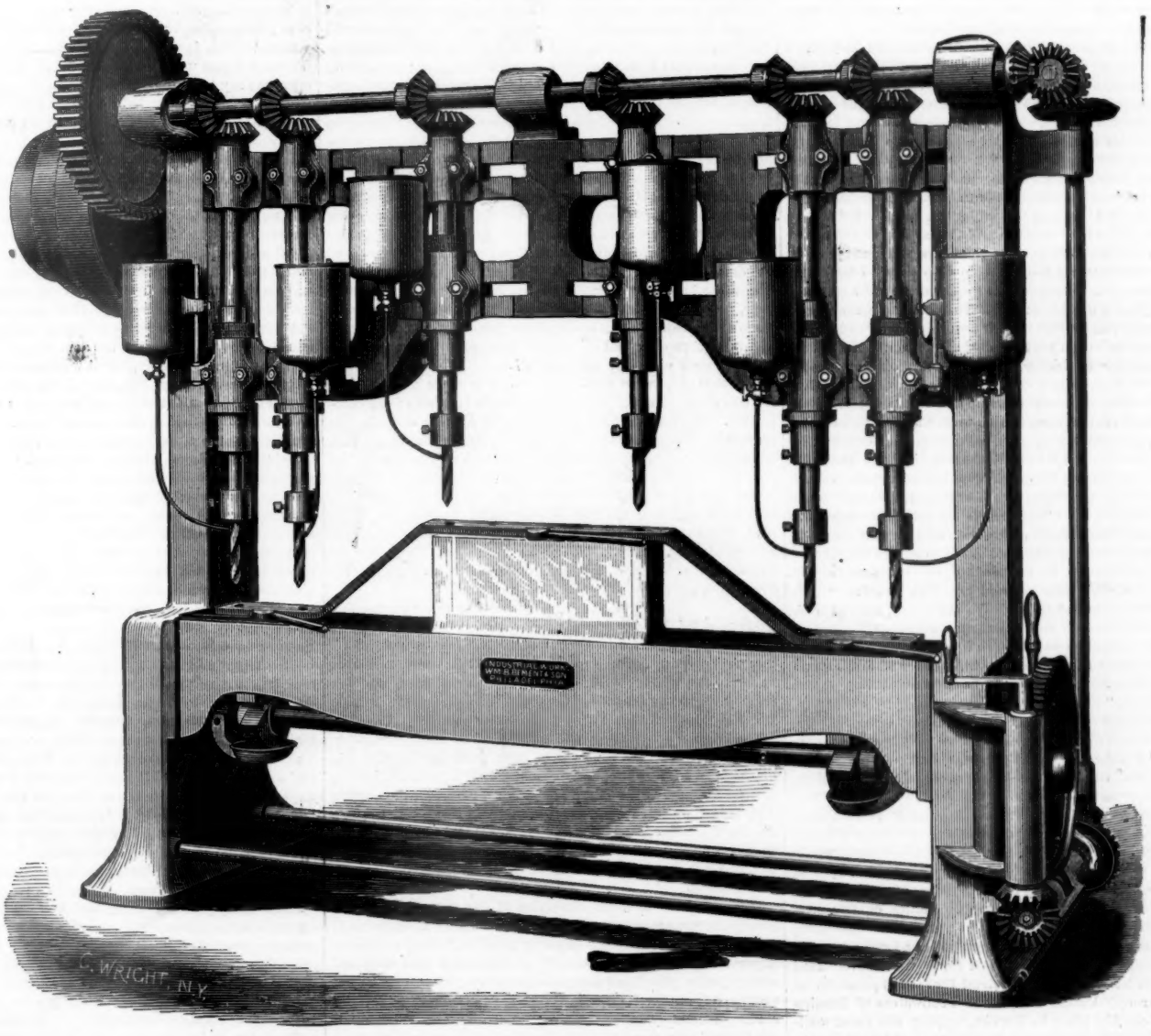
SATURDAY, MAY 18, 1872.

Drilling Machine for Car-Truck Frames.

To such an extent has new and special machinery been introduced of late for doing railroad work that unless a man engaged in that occupation is constantly on the alert he will find that the work he is doing costs much more than it does in shops where the most improved tools are used. The machine which we illustrate herewith is an example which will prove our statement. As a very casual inspection will indicate, it is intended for drilling the holes in car or tender truck frames. Its general construction is shown very clearly in the engraving, and, as will be seen, it is capable of drilling six holes at a time. That the work will thus be much more quickly done needs, perhaps, no words to prove, and it has the additional advantage that each frame drilled will be an *exact* duplicate of all the others. If the long-looked-for time—for which the Car-builders' Association is now working—will ever come, when *all* car trucks will be duplicates of each other, machines like this must play a very conspicuous part, and must be employed for all the work which is done. Until that condition of things is brought about the next best thing possible is for each company which has established any standard for car trucks to use machines which will be certain to do all work exactly alike. In times gone by, when those of us who now begin to show the sere and yellow leaf were in the days of our apprenticeship, it was supposed that work "laid off" with a two-foot rule was done with sufficient accuracy, and we were then not over much particular whether the rule was *exactly* two feet long or not. Wooden templates were the next step in advance, then metal ones, and finally gauges with hardened steel bushings came into use. None of them, however, will insure so great accuracy as a machine whose operation will be exactly the same at all times, which is the case with drills like that shown by our engraving.

This machine is driven by a belt on a cone with three changes of speed. The spindles are connected with one shaft, and each drills its hole simultaneously with all the rest. They can be adjusted laterally, so as to give any desired distance between the holes. Each spindle has a socket, which is adjustable vertically, to enable the drills to be used on different levels. Both the feed and return movements of the table are automatic, leaving the operator nothing to do but to place and remove the work and see that the drills are lubricated. The table is raised by a worm and gear connected by a horizontal shaft with two cams, shown very clearly in the engraving. It can also be raised quickly by hand when it is desirable to do so.

These machines are built by Messrs. Wm. B. Bement & Son, of Philadelphia, who will doubtless be glad to supply any further information regarding their price, etc.



Drilling Machine for Car-Truck Frames, by Wm. B. Bement & Son, Philadelphia.

Contributions.

RAILROAD SYSTEM OF CALIFORNIA.

NO. III.—PRESENT CONDITION.

SAN FRANCISCO, May 7, 1872.

Railroad-building in California, like every other art brought from the Atlantic States, is attended with a number of circumstances which differentiate it somewhat from the original. Here is found a new climate, an unaccustomed succession of seasons, no timber-trees where they are most needed, rivers which in one season dwindle to mere threads or disappear altogether, and in another become raging torrents. The cars coming over the Sierra Nevada in a few hours' run bring down to Sacramento on their roofs a deep covering of a substance never seen in that city, to wit, snow, so that the schoolboys, in true Californian character, even snowball each other with an imported article. On the vast plains of the interior basin, during the long, rainless summer, the whole covering of the earth, the grass, the wheat-stubble, the fences, become so thoroughly desiccated that they are liable to be fired by the passing locomotive. Thus there is presented the anomalous spectacle—one of those contrasts in which California abounds—of a train passing through sixteen miles of snow-sheds, built to protect it against the stupendous avalanches of the Sierra, and in four hours' time descending to a region where the very track is liable to be burned up. And still more, even these snow-sheds are liable to be burned in summer, so dry do they become—a fact which necessitates the keeping of a fire-engine constantly on the summit, ready to plunge down swiftly in either direction on occasion.

On the plains of the interior, as soon as the dry season is fully set in, the farmers who are careful plow up fresh strips along the track, at the distance of a few rods, so that, if the locomotive fires the track or the fence, the conflagration cannot spread into the fields. As soon as the grass and weeds are dead along the track, and before they become inflammable, all the section-hands are set busily to work to scarp them off with shovels, and rake them away from the ties down the embankment. On the trunk-line of the Central Pacific a hand-car is frequently kept in readiness at each station, and whenever an express train passes, two stalwart Irishmen mount their little engine and give chase to the best of their ability, to discover and put out any smouldering fire kindled by a spark. A passing locomotive once fired a splendid field of standing wheat of a hundred acres or more, and the farmer clapped his mules into the reaper and started on a lively trot to clip a swarth around a certain portion in hope of saving the remainder, but the flames gained on him so rapidly that he was obliged to cut the traces, mount one of the animals and escape for life, leaving the reaper to be burned.

In the valleys of the coast range, on the other hand, the trouble is not so much with fire as with water. These valleys are generally long and narrow, separated from each other by broad, low mountain ranges, very sparsely wooded with stunted live-oak, *madrono*, here and there a pine, and occasional patches of evergreen *chamizal* and *encinal*. In the course of twenty years the inhabitants of the valleys, which are either wholly treeless or contain only a few live-oaks that have wisely been spared, have denuded no inconsiderable portion of these ranges of what little forest they originally bore. It is a well-known fact that a semi-tropical region which has been stripped of its trees becomes subject to violent and destructive rain-storms. Robert Von Schlagintweit, who visited this coast some two years ago, and has since published a book called "The Land and the People of California," calls special attention to this fact, and warns us earnestly to profit by the example of Greece, Spain and his own country, and preserve the forests, restoring by planting what must necessarily be consumed.

As a consequence of this thinly wooded condition, the coast region is visited by less frequent and more violent rain storms than formerly; and the ranges are so broad in proportion to the valleys between them, that during the heaviest rains of winter the latter become flooded and gorged with the enormous wash of the hills. Most of the railroads are graded in the dry season, and when the rains set in it is frequently found that there are not enough culverts, and that those which exist are too narrow.

For instance, last winter a good part of the San Francisco & North Pacific was graded between Healdsburg and Cloverdale before any of the "early rains" fell; then on the 17th of December "the windows of heaven were opened," and for three weeks the sun was not visible fifteen minutes, while the rain dropped straight down, with very few intermissions, day and night. In this city over two inches (I forget the precise figures) fell one day inside of seven consecutive hours; and in Shasta City 89 inches fell in less than three months! When this storm ceased it was discovered that the water had been making a few places

for culverts. Indeed, it was fortunate that an embankment had been thrown up and left for the final examination and test of that excellent workman, Mr. Rain Water, C. E. Not long ago I passed over the road a second time, and observed that the engineers had wisely taken the hint, and constructed a number of new culverts and enlarged old ones, making them sometimes twice as wide as before. Next summer, when California is one great sea of dust, these culverts will appear disproportionately and even ridiculously wide; but about once in ten years there comes a deluge which demonstrates that there is not a square inch too much space. It is noted as a singular fact that '52, '62 and '72 have been the wettest years since the American occupation.

Though these supreme climacterics come thus seldom, yet every winter is rainy enough, one would think, to have taught the California engineers before this time to make larger allowances than they do. The San Jose Railroad has been disabled several winters in consequence of this fault in the original construction, and last winter there was scarcely a road in the State which was not crippled for several days, and some for weeks. The California Pacific did not recover for three months. On most of their roads the Central Company displayed their usual splendid energy in grappling with the disaster.

Of the equipments of California roads little need be said. I have before me an official list of the rolling-stock on the Central Pacific trunk, from which it appears they have 180 locomotives, 81 passenger cars, 1,215 platform cars, 720 freight cars, 20 fruit cars, etc., in all, 2,803. The large proportion of locomotives to the whole stock—one to 14¼ cars—attests the heavy expenditure of power required on the Sierra Nevada. The disproportionate number of platform cars is accounted for by the fact that, in the rainless summers of California, the cereal crops not only lie months in the open field but are transported chiefly on platforms. The fruit cars are probably a purely "California product," so constructed with ice-chambers and refrigerators that fruits and meats will keep in them sixty days. I doubt not they have been already described in the GAZETTE, and I will only add that they are a notable success. The company manufacture chiefly fruit and freight cars in their own shops, but the Kimball Car Company of this city have furnished them several very elegant passenger cars, one of which contained thirteen different woods, the list of which is quite a curiosity. The Silver Palace Car, finished with black walnut and maple and clamped with silver, with its graded state-rooms, double windows of cut-glass and rich carpets, is nearly the equal of a Pullman—not quite. The rails range from 100 to 120 tons to the mile, and are generally fastened with fish-joints. Though the California roads are not yet so elegant, either in equipments or depots, as many in the Mississippi Valley, I think they are visited with fewer accidents in proportion to their length. I do not recall a single serious casualty on the Central proper, and only two on the Western.

In their great shops at Sacramento the company employ about 1,000 men, for whose convenience they maintain a hospital, in which there are frequently twenty or thirty inmates, and a hospital library. In Sacramento they have a Chinese agent, whose business is to attend in the depot and direct his traveling countrymen; and they formerly had, and still have, I believe, Chinese conductors on certain cars and trains appropriated to the use of the Celestials.

In the first paper of this series I enumerated most of the railroads in California, and it needs now only to speak somewhat of the extensions in actual progress, then of the general system. We will begin on the coast north of San Francisco, and sweep the semicircle around to the south.

The San Francisco & North Pacific, beginning at Petaluma, follows up what is supposed to be the ancient course of Russian River, through Santa Rosa and Healdsburg to Cloverdale. It was required to be completed to the latter town by the 19th of March to receive the subsidy of $5,000 a mile voted by Sonoma County, and, despite the extraordinary difficulties of this winter, the company drove an "excursion train" into that town, somehow, four days in advance, though the road was greatly in need of ballasting and was not opened for regular travel until about a month later. It is understood that it will presently be continued through Ukiah, then to the headwaters of Russian River, and down Eel River to Eureka, tapping the great wool-growing region of Mendocino and Humboldt counties, the magnificent redwood forests of the lower Eel River, and the almost unequaled margin of agricultural land around Humboldt Bay. Russian River Valley will average less than a mile in width throughout, but it produces 25 or 30 bushels of wheat to the acre, and, what is better in this State, the crop never fails. Corn is grown to a considerable extent on the lowest bottoms, sometimes giving 100 bushels, and averaging 60. The wool-clip of these two large counties, most of which will be moved by this railroad, reaches about 2,000,000 lbs. a year, and will always be the second most important staple. When the road shall have reached Humboldt Bay, it will supply San Francisco with potatoes as Jersey does New York with peaches, for "Humboldt potatoes" are by far the most celebrated on this coast. Last summer I traversed the entire line of this road as far north as Eureka, and found extremely little arable land along Eel River until the mouth of Van Dusen's Fork is reached; but from that down and all around the bay there is a body of soil unsurpassed on the continent for fertility. C. Frost, of Nigger Head Prairie, last summer harvested 116 bushels of oats per acre; and 80 bushels of wheat is no uncommon yield.

The California & Oregon Extension, which is leisurely moving on a few miles above Red Bluff, will encounter a rugged and difficult country. Even without this, it is likely to be beaten in the race for the Oregon line—if that can be called a race in which only one party are making special efforts—by the magnificent energy with which Ben Holladay, that Pacific Cæsar, is pushing his end. Last summer I passed over this route also as far north as Yreka, and after leaving Red Bluffs found no arable land worth mentioning, except along the narrow valley of the Shasta, and a compact body of about 50,000 acres on the broad, flat summit of the Shasta divide. This divide is girded with an enormous growth of fir and pine, but is mostly fertile and gridironed with creeks running down from Mount Shasta, so that it will be well adapted for dairying. Above Mount Shasta, and especially around Yreka, the arid, volcanic plateau of Nevada sweeps broadly across, in a bleak, hot, stony waste. Yreka is a town of 3,000 souls, but the mines are its principal excuse for being there. For about 300 miles this road will have very little way-traffic as soon as the pineries are exhausted, although these are extensive on Pitt River and the upper Sacramento.

A line which will exert a more beneficent influence than any other is the San Joaquin Valley Railroad, now reaching down at the rate of a mile a day toward Visalia. It will have this effect because it will penetrate the old Spanish region, and do more than anything else to break the accursed, half-barbarous despotism of the cattle lords. You may think this is rather strong talk; but if you had seen these swaggering and arrogant nabobs order their *vaqueros* to whirl heavy bodies of cattle purposely over some poor farmer's little corn-field, to trample it into dust; or lasso up the survey stakes as they curvet and pirouette around their cattle; or herd together a lot of Mexican thieves and cut-throats for weeks and months, as they would "dumb, driven cattle," that they might vote down a no-fence law, and repeat this infamous farce year after year; or come up to Sacramento to make drunken, bullying speeches in the Legislature, defying them to their teeth to enact a no-fence law, or build a railroad there—if you had witnessed all these things, you would not wonder at anything that might be written. For years and years these brutal, "ox-born souls" have harried the farmers even to bloodshed, stamped out one honest man after another, or goaded him at last to such desperation that he tried conclusions with the pistol, and dunged his fields with the carcases of the wretched skeleton cattle, which their owner had multiplied to the starving-point, simply that he might "pasture out" the detested farmer. For lack of a railroad one of the most magnificent regions of California has lain a pasture year after year, merely that these semi-brigands might supply San Francisco with mustang flank-beef and cow-heel at monopoly prices; and what farmers could live there have expended nearly the value of their wheat for transportation.

No other railroad in the United States is more needed than the San Joaquin Valley, and few will pay better from their completion. The farmers have penetrated far enough down to get possession of Stanislaus County, and this spring that is one vast wheat-field, as you see sometimes in Illinois or Minnesota. In 1869 the yield was 4,000,000 bushels, and this year it is estimated that it will reach 6,500,000, which, as the population is only 6,500, will be at the rate of a thousand bushels for every man, woman and child! Besides that, Stanislaus is the second wool-producing county in the State. From these facts can be gathered what a region this road is about to penetrate and redeem from the odious despotism of the stockmen.

The Southern Pacific, which is the only railroad that seems likely to enter this city direct, after running 100 miles down the Santa Clara Valley, seems to be taking a rest. It is understood that the company hesitate to carry it over the Coast Range at Panoch Pass, which would entail heavy expenditure, and are seeking to get the consent of Congress to push it up the Salinas, and so across to Tulare Valley by an easier pass.

The original programme is to be changed in another respect. The Western Pacific, which now runs from Sacramento *via* Stockton and Livermore Pass to Oakland, in a great semicircle, is to be changed to the shape of a letter S reversed, the eastern limb bulging south around the San Joaquin delta, the western one north around Monte Diablo. This will make it even longer than it is now *via* Livermore Pass, but it will be level throughout, and engineers think this more than compensates for the added length.

It is said that "It is not the policy of the Central Pacific to divulge its programme." But from movements already made and from a letter recently written by President Stanford to the Supervisors of San Francisco, it should seem that they are working out a grand and comprehensive plan, which may be approximately outlined as follows: The San Joaquin Valley (including ultimately one or more overland roads from the South), the Central proper and the California & Oregon are to round Monte Diablo on the north, converge in Oakland, then shoot out across the bay to Goat Island. All the roads northwest of the Sacramento River are to be brought to the eastern side of the bay, probably at Carquinas Straits, thence to Oakland, to terminate with the others in a grand depot on Goat Island. Just north of this island the company have purchased from the State a large area of submerged land, whereon, if the government cedes them a part of the coveted island, it is intended to deposit the cuttings made in grading it down, which will give them ample terminal accommodations. If this plan is carried out (and the opposition of San Francisco to it is quite selfish and narrow, simply that a few men in this city would be deprived of the privilege of handling the freight) there will one day be grouped in the heart of San Francisco Bay such an assemblage of depots as probably will not be surpassed on the continent.

STEPHEN POWERS.

TRAIN DISPATCHING.

BY A HINDOO.

[Continued from page 202]

Examining the present so-called system, in the last issue, we found that there were no less than *nine* different ways in which fatal errors were possible. In each case the error was the omission of some duty by an individual, which, from the nature of the system, must necessarily or would probably pass unnoticed until too late; or the error was a failure of memory, which also would probably pass unnoticed until too late. The omission in the first case might happen through ignorance, inattention or want of memory—and the failure of memory is common, in greater or lesser degree, to all minds, from that of a Newton to that of a "sardine." A system which does not recognize the frailty of human minds, and which does not provide a check against such casualties, is not a safe one. Indeed, without any stretch of imagination, we may say that such a system is *specially designed to cause accidents;* for as sure as man is human, so sure it is that under such a system accidents more or less *must happen.* The man who, standing by, does not attempt to prevent the commission of a crime is himself guilty as an accomplice. Taking this maxim as a standard, let us compare the present system and the one I advocate.

The present system is so arranged that if a certain party *fails to do* a certain act, a collision results. In my system, if any of the parties *fail to do* any act, no harm can result beyond the bringing of trains to a stand; and if any of the parties *do an act* which might cause an accident, there are at least two others watching him who would *at once* detect the error and *rectify it,* for each important act requires the *concurrence* of at least three parties, and the number of persons who thus watch each other can be increased according to the necessity or financial means.

But, says "X," "You say your system is safe, provided all the rules are observed. So is every system." True; but in the one case *you cannot enforce obedience* to the rules; in the other case you can. This is a marked and radical difference. Is it not? Who can fetter "the chainless mind?" Who, expecting obedience, can say to a mind, "You shall not forget?" But the mind may be directed and by habit trained to run in a certain groove, and means adopted to detect and prevent every attempt to leave that groove.

It is a rule of the present system that a dispatcher shall not run one train on the time of an opposing one, without first holding the latter; but what rule will prevent his forgetting that he is going to run one train on the time of another? No minuteness of *post-facto* supervision, no strictness of discipline could possibly eliminate such a liability to error. In my system nothing is trusted to memory; every movement is recorded and checked off by at least three men, widely separated by interests and circumstances. All that is necessary to keep such a system is working order is to guard against habitual or frequent omission of *any* of the acts required. A casual error could not result seriously, for it would be at once detected and rectified; but habitual omission of the precautions by all concerned would result fatally. Such conduct is easily prevented by a very simple method of routine inspection. "An ounce of prevention is worth more than a pound of cure."

Major Tyler, Railway Inspector to the British Board of Trade, perhaps the best living authority on railroad matters in general, lays particular stress on the necessity of discipline to the prevention of accidents. As he says, even the block system is no panacea if obedience is not enforced. In the present system of American train-working there is no attempt to enforce discipline; in fact, such is impossible, for there are no rules or regulations laid down to which obedience is expected. It must be remembered that true discipline weeds the staff of employees, retaining only those who will carry out instructions, who are the only ones required. It brings the superintendent into intimate official relations with his subordinates, enabling him to ascertain their capabilities. It does not coerce; it selects. Some men are by nature incapable of obeying instructions which require attention, memory, forgetfulness of self and a high sense of duty. Some men—like the fat boy in Pickwick, who fell asleep the moment he sat down anywhere, and who had only two ideas in his head, sleep and food—seem to be always asleep. Their senses are never on the alert except when "that tocsin of the soul," the dinner-gong, sounds. Such men may make good cooks, admirable waiters, excellent aldermen, but should be kept off from railroads. Our train of thought has led us from train-dispatching to the dispatching of dinner; let us return to the former.

I have fairly proved that my system is not open to the same errors as is the present one, and that it is not liable to any serious error; if, then, it is so much safer and certain in its operation than the present one, and costs very little or no more, the present so-called system must have some very great advantage counterbalancing its disadvantages to justify its continuance. What are the advantages? As yet the only advantage claimed for it by its advocates is the celerity with which it moves traffic over the road. As I have shown, this amounts to a saving of from 24 to 40 minutes per train per 100 miles.* Take the larger figure, 40 minutes per 100 miles, yet you have nothing worth the large sums annually lost in wrecks, the inconvenience, loss of time and prestige consequent on suspension of traffic while the debris is being cleared away and track replaced. It must be remembered that the heavier the traffic and the more trains on the road, the oftener trains must stop to cross, and therefore the less loss of time there would be under my system as compared with the present one. Thus I have calculated that on a road of twelve stations under the present system, with a fair traffic, freight trains will stop for orders or to shunt or to wait for arrival, say six times; but the traffic might increase so much that more crossing places would be required, and so trains stop eight or ten times. On roads of lighter traffic, they might not stop more than three times, but then the lighter the traffic the less valuable is speed. When an accident happens, if serious, there is much lamentation, indignation and visiting of displeasure in a summary manner. If the mistake by some good luck end fortunately, little is said. Yet as far as the dispatcher, or whoever is in fault, is concerned, the degree of sin is no greater in the one than in the other. When an accident has happened it may be well to seek diligently for some wretch who shall bear the brunt; but in the

* Perhaps in assuming the number of *telegraph* stations at 12 per 100 miles I may seem to have intentionally adopted a minimum. I do not think it much smaller than the average on single-track roads, but 17 stations suit my argument just as well. That number gives us stations at less than six miles apart, and the loss of time, according to my calculation, need be not more than 34 minutes. *The heavier the traffic the less loss of time.*

quiet of his own sanctum, the manager should examine narrowly all the circumstances; he should endeavor to peer beyond the outward conditions to view the inner; he should trace every result to the cause, and, finally, ask himself the question, Am I not somewhat to blame? At the end of the year, when managers take a retrospect of the year's doings, they need not congratulate themselves on the paucity of casualties until they have first given an honest answer to the question *not* "Have we had few or many accidents," but "*Need we have had so many?*" If unfortunately the list is heavy, away with vain regret! Take heart, remembering what Carlisle says in Richard II.:

> "My Lords—wise men ne'er wail their present woes,
> But presently prevent the ways of wailing."

Some or rather most of the writers on this subject have declared that the accidents which have happened can be traced to the inferior qualities of train dispatchers, operators, &c.—not to the system. I grant that with any system, good or bad, the better and more intelligent the men, the more satisfactory the results; but it also follows that the better the system operated by the same men the more satisfactory still will be the results. That a good system worked by bad men is no better or at least not more desirable than a bad system worked by good men is an argument almost too absurd for mention; yet this in reality is the insinuation of most of those who have as yet favored us with their views. Some—a very few—managers do gather around them first-class talent, but the majority either are bad judges of character or do not take the trouble or cannot afford to secure good men. Managers themselves are not selected by any infallible process. Darwin's theory of natural selection by which the weak ones are eliminated and the strong, able ones perpetuated is very slow of operation and has not yet effected any result in the railroad "upper ten." Every system should be designed to correct and guard against the frailties of human agents, and should not expect from them a greater or a lesser degree of imperfection.

"B" (April 6) thinks it not necessary that there should be "a particular set of rules for all roads in this country, with their widely different requirements and necessities." I trust no one has imagined that I could be so silly as to suppose that the wording of rules should be the same on every road; but I do say and insist on it that on all roads of the same class—for example, single-track roads—the principles of the systems should be identical. In every operation that man has yet turned his hand to, of several different methods *one must necessarily be the best.* In the operation of train-working, the best method having been ascertained, any deviation from it is a loss, by accepting the inferior instead of the superior article. It must moreover be remembered that all roads of the same class have several common characteristics. Thus, take those roads that have each

A single track,
A telegraph system,
Locomotives,
Fallible men:

None of these parts is affected in the least by any local influence.* Their management can be the same under all circumstances, and rules regarding their relation, *one to the other*, cannot be affected by influences that cannot affect those parts. Now rules of safety (*from butting collisions*) regard only the relation of those parts *one to the other* and are therefore uncontrolled by local influences. *Other* parts are affected by localities and require that local rules should be framed. From this it follows that every system of train-working is made up of two parts: the standard and the local.

Now in discussing this very important branch of railroad management—viz., train-working—let us *all* bear this distinction in mind. Let us touch lightly on local details and deal with the principles involved. "B's" letter above referred to is full of slight errors and misconceptions of my meaning. Neither space nor time permit my pointing those out. Suffice it for me to again repeat that the rules given by me were with regard to the prevention of butting collisions only, and were not intended as a complete system of train-working; they involved principles only, and *not details.* I may here remark that uniformity is not to be despised. If it were possible for all single-track roads to adopt a uniform system, and to reconstruct such system, from time to time, if necessary, in general convention, a great point would be gained. Experience on one road would be valuable to a man removing to another, which is not always the case now. Then there would seldom be anything to unlearn.

It will be well for those discussing the question to remember:

1. That the superiority of the present over the past system is no guarantee that the present is the best that can be designed.
2. It does not follow that because one or two roads, through judicious selection of employees, have worked the present system with a small list of casualties, therefore the system is good enough.
3. No improvement can take place until somebody suggests such.
4. Snapping the head off the first man who proposes improvement is no proof that the defenders of the *statu quo* have argument on their side.
5. That mere declamation and bold assertion do not convince or deceive any one who understands the subject, and the opinion of those who do not understand the subject is not worth striving for.

"X" may point with pride to his road, perhaps to a few others, doing an enormous business, with few accidents. Very good; he is doing the best that can be done under the system. On the other hand, I can point to one road, not a very long one, owning only *two locomotives.* Within *three months*, after having had *two* narrow escapes from butting collisions, they finally succeeded in completely demolishing their whole stock of engines, killing all their drivers and injuring ten or twelve persons. I have not ascertained under what system this magnificent result was attained. I mention this to show that we cannot from either extreme deduce any idea as to the general working of American roads.

* That is, comparing one road with another.

CASUALTIES ON AMERICAN AND BRITISH ROADS COMPARED.

"X" (April 20) has made a statement which should not be passed over, as it may mislead those who have not read the Massachusetts Commissioners' report more understandingly than he apparently has. "X" infers that British roads on the more "perfect" system have not been safer than the "unsafe" American system, and quotes the report:

British roads injured one in every	430,000
Massachusetts roads injured one in every	1,475,000

"X," looking to these figures, remarks: "If the manner of movement has been more perfect on British roads, there has been some other point on which they are behind." Let us examine the working of the roads on the basis of facts given by the Commissioners, and see whether these figures gave a fair comparison.

English statistics of accidents, it is admitted, are pretty correct. The system of police and governmental inspection there, the vigilance of the press and the general regard for human life render it almost impossible to conceal or hush up any casualty. Are American statistics reliable? The Commissioners quote from report of a former committee thus: "*The committee have reason to believe that the return of accidents is very incomplete. They have the best reason for saying that many accidents have occurred of which no notice is taken by some of the corporations in their returns,*" and "*the experience of the Commissioners affords some ground for concluding that this criticism is applicable to the more recent as well as the earliest returns.* The Commissioners going over *ten* years compared the total ascertainable casualties with result as above given, much in favor of American roads; but when we come to later years the results are as follows:

	British.	Massachusetts.
1866, injured one in every	328,829	192,407
1867, " " "	326,562	176,570
1868, " " "	374,753	209,378
1869, " " "	190,446	171,502
1870, " " "	372,098	256,752

In each of these years the American proportion is far greater than the British. But the comparison is incomplete and is no criterion as to the ability of the managers or superiority of the system, unless we also compare the conditions under which the traffic was carried.

In England trains run at greater speed and at shorter intervals than on American roads. In America passenger trains are of the same class; in England they are of various classes, fast trains frequently following and passing slower ones. The nature of the country is such, being so thickly inhabited, that curves are more frequent and obstructions to sight more common, so that drivers can seldom see far ahead. The climate of England is also productive of more fogs than that of Massachusetts. Every railroad man of small experience and average brains understands that it is easier to work what I may call an "open" traffic than a "close" one—that the former demands greater skill and energy to work safely than the latter. He also knows that passenger trains colliding at a high rate of speed are likely to injure a larger number of persons than at a lower speed, and that two passenger trains colliding would probably injure more persons than if one only was a passenger train. Thus in the list of British accidents for *one year*, 1870, we find some accidents giving large figures—113, 21, 26, 52, 18, 12, 29. On American roads the most disastrous accidents reported during *twenty-five* years were 107, 39, 38, 33, 171, 21 killed, and a large number injured (New Hamburg). This comparison of the serious *collisions* in England during *one* year and in America during *twenty-five* years, shows plainly the condition of the traffic in the two countries. In America, too, I think, many accidents are avoided by vigilance and carefulness of the drivers, who, not being pressed for time as they are under the conditions of the British traffic, are enabled to be more cautious.

It must be evident to every one who examines the figures and thinks a little, that with an increasing traffic, becoming yearly more and more difficult to handle, the proportion of accidents is not increasing, but rather decreasing. The commissioners say: "*It is in England that the system of telegraphic signals has been developed to the highest point of perfection, and some of the results attained there are very remarkable.*" *One* station alone in London receives and dispatches per day as many passengers as all Boston. One road received and dispatched during 1870 an average of 650 trains a day between 6 a. m. and 12 p. m. (18 hours). On one particular day 1,111 trains carrying 145,000 persons entered and left *one station* in eighteen hours. All this enormous traffic was carried "without the occurrence of *a single train accident.*" Thus it is seen that "X" was rather hasty in his conclusions. However, this is a matter that does not affect the question raised by me, which referred to single-track roads. There is one point which I will mention here, that the present system of train-dispatching might show a very small list of killed and wounded and yet be a failure. On our single-track roads passenger trains as yet are not very numerous; the dispatcher, feeling the heavy weight of responsibility as regards them, gives them more attention and clears the track for them. In this respect their fewness compared with freight trains gives them a great advantage, so that we might have a very large number of freight-train collisions yet not one of passenger trains.

In conclusion, taking my leave of the train-dispatching question, I must explain that when I first mentioned the subject in my "Notes," I had no intention of going into it so fully as I have. As a casual observer, not connected with the traffic department, I saw results and heard public remarks which drew my attention. My object has not been to exaggerate or to condemn. As I was aware that no general discussion on the matter had ever been held in this country, and that probably very many had not thought of the underlying principles, I judged the time had arrived when such discussion would be most opportune and profitable.

Mr. Quetil and the Narrow Gauge.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your comments on my letter on the narrow gauge, you find no other way to refute my argument than to pretend that I have written what I have not. I doubt very much if this way of doing will please that class of your readers who want positive information and fair discussion.

You say that I assume that on a light, wide-gauge road it is absolutely necessary to run heavy cars with the light rolling stock.

I emphatically deny having written any such thing. On the contrary, I say in my letter that newly-organized wide-gauge companies, which would want to run entirely a light stock, could do it, but on the condition of breaking bulk or not interchanging cars with other lines running a heavy stock. This is positively the contrary of what you pretend I have written.

You also misrepresent the facts when you say that my reasoning is built on the assumption that it is impracticable to use small wheels on the wide gauge. I never wrote such a thing.

You can use on a wide gauge, if you choose, wheels of the same diameter, and even smaller, than those on a narrow gauge, provided that you diminish enough the dimensions of the body of the cars; but then you are obliged to run separate trains, which leads to a great inconvenience and loss, and you are compelled not to let your light stock go on other connecting lines using heavy stock; and the more light cars you will build, the more you will have to break bulk with other lines. The causes of inconvenience and loss to run separate trains of light-stock cars are the following: When one or several light-stock cars are left at a station they have to wait to get out until another light-stock train comes on. Several trains of the old heavy stock might pass the station before those cars could be coupled with any train. This is a loss of time and money.

Cars are made to move on or move loaded as often as possible. If they could run so all the time, it would be so much the better, as it does not pay to run them empty, and pays still less to let them stand.

Unless the light-car stock should be nearly as great as the heavy-car stock (and this could be only several years after the reform was begun), these light cars would not be of much advantage to the company. And if after a number of years the stock was entirely transformed, the company with a light stock could not interchange cars, and would be compelled to completely break bulk with other connecting roads, which would have stuck to the heavy, old-fashioned car.

You ask me what is to prevent the use of short timbers on a wide gauge. My opinion is that nothing prevents it, and that you cannot find in my letter or in my article in *Van Nostrand's Magazine* any indication that I doubt that the wide-gauge cars could be built of dimensions and weight as reduced as those of narrow-gauge cars, save, of course, the extra weight of axles and brake beams; but then I will ask you of what advantage your wide-gauge will be to you when you will have to break bulk with other wide-gauge roads running a heavy stock? Would it not be more judicious when you have light stock on a new line to make the reform complete—to reduce the gauge and to be allowed, by doing so, to run on sharper curves and profit also by the economy in dimensions of road-bed and length of axles and brake beams?

If you want to discuss the matter with me, please do it in a fair way. I think my reasoning and mind just as good as yours, and expect to give several proofs of it. Refute the points I am really making, if you can, and not those you erroneously suppose that I have been making.

Any person who will read what I say attentively will see that my main points of argument are these: 1. Wide-gauge companies actually running a heavy stock cannot reform that stock and avail themselves of the advantage there is in building cars with short sills and small wheels, unless they run their new light cars by separate trains, which would lead to such inconvenience and loss, as I said before, that it is not much worth trying if they are not connecting with other lines running also a light stock.

2. Wide-gauge companies newly organized, which would want a light stock running on 24-inch wheels, would not be able to run it on connecting wide-gauge roads running a heavy stock on 33-inch wheels, nor to let the cars of those roads come on their own, and, consequently, have no advantage in keeping the wide gauge, and lose, by keeping it, the advantage of locating their roads with sharp curves. They could, however, connect their cars and interchange them with those of a narrow-gauge road by laying a third rail or having wheels slipping on their axles to come to the right gauge.

This proves that the difficulty for the reform is not so much the breaking of gauge as the breaking of the draw-head, and the liability of light cars to be crushed or overridden by the heavy ones, and this explains why the wide-gauge companies are not reforming their stock, although you and several others said they could do it, and thought you had found a strong argument in favor of wide gauge.

You seem in that report to have preached in the desert, nobody listening to you.

I hope that you will publish this rectification without delay. You published, the same day my first letter appeared, comments on it, stating wrongly that I had based my arguments on assumptions I never made, and you are bound by justice to publish the correction as soon as possible.

New York, May 15, 1872. CH. J. QUETIL, C. E.

[Will our correspondent kindly estimate what the difference in cost would be between a light narrow (say 3ft.) gauge and a light wide (say 4ft. 8½ in.) gauge road, with an equipment for each as nearly of the same character as the gauges will permit, and which will afford the same facilities for the traffic in each case? He and other advocates of the narrow-gauge system have estimated that the reduction in cost *due to the gauge* is about 40 per cent.

This we deny, and say there will not be 5 per cent. difference, and that the reduction is due, not to the gauge, but to the adoption of a light equipment and slow speed, which can be used just as well on a wide as on a narrow-gauge. In making such an estimate our correspondent must not compare cars with 24in. wheels for one road with those with 33in. wheels for another, nor give a cubic foot of space for 15 lbs. of freight on one, and only the same space for 26 lbs. on the other. Let him compare like things with like, and estimate carefully—as we have done—the difference in weight between light cars for the one gauge as compared with the same class of cars for the other.

He will also allow us to call his attention to the fact that the Toronto, Grey & Bruce Railway Company is now running its 3ft. 6in. gauge cars on *one rail* of the Grand Trunk road, which is of 5ft. 6in. gauge, on which they have laid a third rail. Is there any reason why it would not be just as easy to run *light cars* on *two* rails of that line as on *one?*—EDITOR RAILROAD GAZETTE.]

The Sale of the Alabama & Chattanooga Railroad.

ON LINE OF ALABAMA & CHATTANOOGA RAILROAD, May 8, 1872.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of May 4 I noticed article, "Sale of Alabama & Chattanooga Railroad," which I think in justice to the creditors and the railroad company should be corrected. The road was not "sold under a foreclosure made at the instance of the State of Alabama," but was a scheme concocted by a ring, aided and assisted by R. B. Lindsey, for the purpose of "crushing out" the parties who constructed it. The State law of Alabama grants their endorsement of $16,000 per mile for the construction of railroads, including bridges, &c.; but the extraordinarily short time allowed for the construction of this road (295 miles) necessitated greater expense than the slow construction of many others. Before the road was finished, various means were resorted to in order to cripple the resources of the company, injure their credit and leave them unable to meet their liabilities when the road should be finished; but by the aid and good will of citizens living on and near the line, who furnished supplies and their private capital, the road was finished, the property of the company consisting of depots, machine shops, four new first-class passenger cars manufactured by Jackson & Sharp, two Pullman sleeping cars, two Worcester first-class, eight or ten new second-class passenger cars, mail and baggage cars sufficient for the business, 300 flat and box cars, with buildings and machinery sufficient to construct nearly two cars daily. The construction, iron and material used were all first-class, with the exception of a few miles where the grade was very heavy, and, in order to save time, a temporary track was made leaving the main line about two or three hundred yards around where the steam shovels were at work, but in a short time after the rails were connected the permanent line was ready for the track. The net earnings of the road for the first three weeks after completion were: first week, $16,887.95; second, $29,221.35; third, $31,227.55. Four trains left daily, two from Chattanooga and two from Meridian, running the distance of 295 miles in twelve hours without any danger, and the third day after getting the contract for the through mail and express there were 45 through passengers to go over this line to New Orleans; but the road had been that day stopped by proceedings in bankruptcy before Judge Busteed. The proceedings against the company from the start have been denounced to the world as illegal and unjust, and the sale protested against by the best lawyers in the State, and will yet be settled in the Supreme Court of the United States. Georgia and Tennessee have not foreclosed, nor will they. Since the road passed from the control of the company the property has been stolen, wasted and destroyed, until the road is not worth by $15,000 what it was twelve months ago.

When the deep workings of this ring shall be shown it will bring to light developments that will startle the railroad world, and, if allowed, no railroad company can tell what moment they may be plunged into bankruptcy. Had the company continued in possession, all or nearly all its liabilities would by this time have been satisfactorily settled, the State fully protected, and it would have been the best paying road in the South. So long as the Governor of Alabama pursues the course he has marked out so long will this great enterprise remain stagnant. By his policy the honest creditors are repudiated, and men who never invested one dollar of their capital are to be made wealthy. Not only this, but the effect on the credit of the State is deplorable, and without the least shadow of authority he adds to the State liabilities $312,000 in purchasing what she already had—a mortgage.

CREDITOR.

Light Railroads and Heavy Snows.

TO THE EDITOR OF THE RAILROAD GAZETTE:

But a short time since many travelers were unable to follow the bent of their own inclinations, owing to the prevalence of snow blockades on many of the principal routes throughout the Northern States and Canada. It may be well to inquire whether there be any insuperable reason, from climate or other difficulty, that so many railroads should have their traffic interrupted at a time when water communication is impossible and land travel most wanted.

Assuming that the main cause of stoppage on railroads from snow is the practice of running into deep cuttings, which become a deposit for snow-drifts during the winter season, we are led to the consideration as to whether deep cuttings are unavoidable in a general way, and what advantages are gained by them where employed.

The experience of light railways and the general improvement of rolling stock help to prove that however much deep cuttings and flat curvature were unavoidable in the early days of railroads, it is now long since railroad men of advanced ideas abandoned the antediluvian heavy-work principle for a lighter mode of construction, based on the introduction of steeper grades, quicker curves, and rolling stock better adapted to traverse quick curvature.

But although the foregoing principles of construction are generally recognized, the practice has been to confine their adoption too much to the construction of lines of minor importance; and it would almost appear as if there was still an idea among engineers that light grades and easy curvatures are better adapted for a main trunk line, and further that high speeds are unattainable on a light railway following a circuitous course.

Locomotives are built nowadays able to do almost anything but go up stairs or walk round a corner, but even these cannot maintain a speed over quick curvatures equal to that possible on straight line. It is well understood that the resistance to friction of a well-fitted journal in a piece of machinery does not increase with the velocity at which it is operated, whereas the friction of railroad running increases greatly with the velocity (on curves in a greater ratio than on straight line), and this must be accounted for by some great mechanical defect.

If it be contended that a trunk line where good speed may be required necessitates a heavy class of construction, it is also true that heavy work is that which offers the greatest probability of block-up in the winter; and it can hardly be denied that a slow and uniform speed is faster, in the long run, than a high speed for some hours with perhaps a stoppage of some days.

But it is not true that a high speed requires either a straight or a heavy road, for it is obvious that a cone can be rotated with as great velocity as a cylinder, and with equal safety. The bevel of railroad tires has for some subtle reason been fixed at about one-twentieth of an inch, but as the play does not admit of the bevel becoming available, wheels might as well be made cylindrical as coned. If the bevel of tires were made proportional to a standard minimum radius of curvature, such tires being wide enough to allow the whole of the coning to come into action, then there would be practically no difficulty in maintaining as high speed on quick curves as is now the case upon tangent.

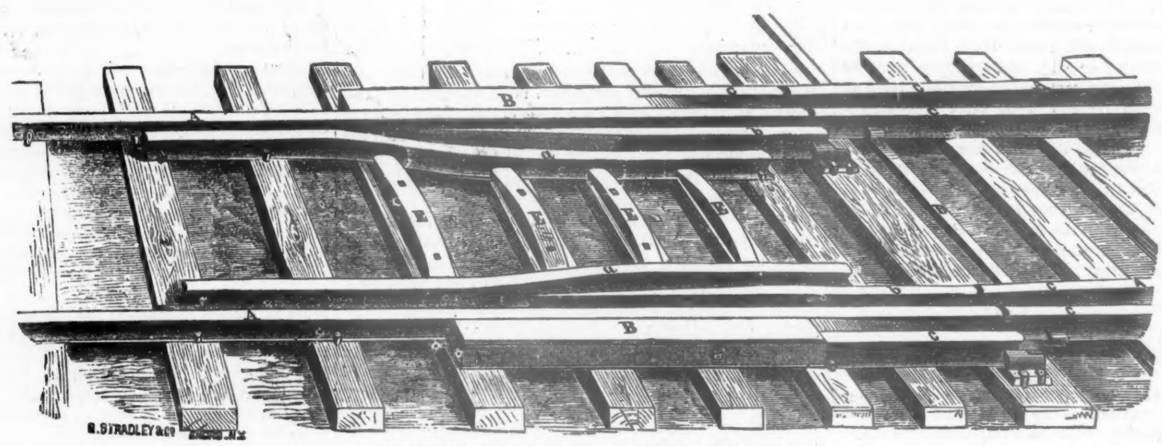
Many engineers have argued that a great impediment to high speed on quick curves is the want of axle radiation. It is a question whether this argument has much force when applied to a rolling stock where the wheel base is made a minimum. It is the want of play that jams the wheel flanges diagonal-wise across the track, and prevents even the small amount of coning allowed from coming into play. This it is that increases the resistance on curves out of all proportion as compared with straight line and tears the road to pieces. No slight modification of the current class of tires will ever remedy the defects arising from want of bevel and play, for it is obvious that a pair of wheels, in finding the proper length of tire circumference proportionate to their respective rail curves, must, owing to the want of radiation and roadway imperfections, be allowed to overrun this amount of circumference to some extent, before the inner and outer circumferences adjust themselves by falling down to the lengths proportionate to their respective rail-curves.

Not the length of a line nor yet the width contributes to the cost so much as the depth; and in a country exposed to heavy snows, this condition has a double significance, for depth means the continual clearing out of snow, the smashing of engines and snow plows, and the employment of large bodies of workmen when all other methods but shoveling have failed, entailing a ridiculous prime cost and an everlasting annual expense for no evident reason.

Some day or other, stockholders who have invested in what they innocently supposed to be the lightest work consistent with safety, will find out that for every mile of railroad ill-adapted to winter traffic, they might just as well have paid for three miles of lighter work with three times the revenue, and half the cost to maintain.

By the employment of quick curves, compensating grades and suitable tires, cuttings may be almost entirely avoided in any class of country. A railroad can be built that one run of a snow plow would be sufficient to clear out at any time; and further, with a good road-bed and well-designed track, the highest speed attained on any line, in any country, may be attained on a line having a circuitous course, without expending extra power more than is necessary to overcome a rise in the want of radiation. The rolling stock in use throughout the American continent is so well adapted for traversing quick curves, so far as the wheel-base is concerned, that radiating axles would be almost a superfluity on any existing road; and granted that the question of bevel and play was satisfactorily settled, the radiation of axles might be consigned to oblivion by all parties. There is no great difficulty in designing a set of radiating axles for a car, but it is doubtful whether the weight of the apparatus would not require more power to move it than the power required to move the arrangement at present used without it.

How the radiating principle may be carried out with any approximation to mathematical accuracy on locomotives, is a question that is likely to remain in the dim future for some little time to come, and possibly railroad affairs may go on very pleasantly for another generation still, although this interesting question remain as insoluble as ever.



COOKE'S IMPROVED SAFETY SWITCH.

"S" and "Hindoo's" Train System.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of the 27th of April your conservative correspondent "S" has "written me down an ass." I must confess that my imperfect mental vision beholds neither the "symmetry" nor the "strong and clearly defined checks" that he mentions. As he can see them so plainly, but has not yet pointed them out, nor has anybody else, will he do me the favor of setting me right on those points? "S" has evidently misunderstood the question from the first, and has imagined that platitudes are the expressions of wisdom; but he has marshaled figures in his attacking array. Were it not that in my railroad life I have seen "many a time and oft" what figures, "which can never lie," can be made to show, I should at once give in, but experience has taught me that such a foe is invincible only on the side of truth.

"S" does not, I presume, mean that it will take 25,000 words at each station to move 25 trains, which would be 1,000 words for each train. If he means that the 25,000 is the total number of words at 20 stations in 12 hours then $\frac{25000}{20 \times 12}$ = say 105 words per hour at each station = less than five minutes' work. *Mons parturient*, &c. "All who are familiar with the subject will see at once that such a performance is impossible," *only to those that cannot operate.* "S" writes prettily. Will he favor us once more?

HINDOO.

Cooke's Improved Safety Switch.

This switch is constructed so that in whatever position it is placed it will always conduct an engine or cars either to the main or side track. This is accomplished by moving four rails instead of two, and by means of the safety rails, *B*, *B*, and guard rails, *a*, *a*. The safety rails are made very wide and inclined at one end so that when the rails are in the position shown in the engraving, if an engine should approach the switch from the right-hand side on the rails *A*, *A*, the flange of the wheels on the rail *A* (the upper one in the engraving) will mount up the incline *C*, and when the opposite wheel reached the guard-rail *a*, it would guide both on to the main track. If the switch was

turned the opposite way, exactly the same result would be caused by the incline on the opposite side of the track.

A, A is the main track; *C C, C C*, the movable rails, which are operated by the bar *D*. *b, b* are pointed rails, spiked down solid to the ties. *a, a* are the guard rails. *F, F* are pieces of wood spiked down to the ties, which hold the rails in position. *B, B* are the safety rails, which are made of hard wood and plated with heavy iron on their upper and under surfaces. They have a gradual taper at the end toward the movable rails, to allow the flanges of the wheels to roll up on top of *B, B* and across *A, A*.

An ordinary cast-iron chair is used for this switch, and is the only cast-iron used in its construction. The safety-rails are all spiked to the ties, independent of each other, and do not form any part of the main track, and it is claimed that for this reason they are not subjected to constant wear from passing trains and are therefore less liable to get out of order than they are on other safety switches.

The switch is now in use on the New York Central Railroad, near the junction of the Northern Central at Canandaigua, where its operation can be seen; or further information can be obtained regarding its cost of construction, etc., from the Cooke Safety Switch Company, Canandaigua, New York.

Train Accidents in April.

On the evening of the 4th the locomotive of a freight train on the Camden & Atlantic Railroad exploded while standing on the track at Glassboro. The engineer was thrown about 60 feet and probably fatally injured.

On the evening of the 4th a collision occurred at Brighton, Ill., between a southward bound freight train of the Rockford, Rock Island & St. Louis Railroad and a northward bound passenger train of the Chicago & Alton. The evidence at the inquest is reported as follows:

"About half-past seven on Thursday evening there was an extra freight train standing on the Rockford & Rock Island track, some distance ahead, and the engineers could see the lights of each other's engines. The freight train had been delayed on account of a broken car. The crossing was about midway between the two trains. The Rockford & Rock Island freight commenced to move in the direction of the crossing, but came to a stop before reaching it, as though to give the Chicago & Altou train the right of way. In the meantime the passenger train had reached the stopping-post at the south side of the crossing and came to a stand there, the freight train being at the north side of the crossing. The engineer of the passenger train whistled off brakes and started for the crossing. He had almost reached the crossing, when he saw the Rockford & Rock Island freight train coming round the curve to the crossing, and he whistled down brakes, shut off steam and did all in his power to stop the train. The action of the engineer on the freight train, it is asserted, was to put on a full head of steam and rush for the crossing, in the hope of being there first. The result, it is claimed, was, that the two heads of the two engines came together with such force that they were thrown from the track. The engine of the freight train was the most damaged. Both the engineer and the fireman of the passenger train leaped off the engine when they saw a collision was inevitable."

The freight engine was torn to pieces and the passenger engine much damaged. The fireman of the freight engine was instantly killed and the engineer seriously injured. The engineer of the passenger engine was slightly bruised.

On the night of the 5th a passenger train on the Pittsburgh, Fort Wayne & Chicago Railway ran into the rear of a stock train on the same road, at Valparaiso, Ind., killing a cattle dealer who was sleeping in the caboose car, and fatally injuring the fireman on the passenger car engine.

On the 6th a train on the San Joaquin Valley Railroad was thrown from the track near Turloch, Cal., by a sand drift which the wind had blown across the track. The locomotive and three cars were badly damaged.

On the night of the 8th a passenger train, excepting the sleeping car, was thrown from the track of the Mobile & Montgomery Railroad, near Sparta, Ala., by a broken rail. The cars were badly damaged, and six persons were slightly injured. The train was not running fast.

On the morning of the 9th a sleeping car at the rear of a passenger train on its way from Cairo to St. Louis, while on the Illinois Central Railroad five miles south of Carbondale, became detached. It was some time before the train men discovered it, and the passengers in the cars were all in their berths. When its loss was discovered the passenger train was backed down as rapidly as possible, it being known that a freight train was not far behind. Before reaching the detached car the freight train came in sight, close at hand. The conductor of the passenger train had just time to rouse the passengers and they to get out of the car when the freight train ran into the sleeping car, breaking it to pieces and damaging the locomotive badly. No one was hurt, except by jumping from the car in great haste and without the protection of ordinary garments.

On the 9th, just as a passenger train was approaching a tunnel near Lewiston, on the Lewiston Branch of the New York Central & Hudson River Railroad, a large mass of rock fell on the train. The engineer saw it falling, but, being too close to stop the train in time to avoid striking it, tried to run past. One mass fell in front of the engine and threw it from the track, and a larger mass struck the train between the smoking and baggage cars, and crushed in their adjacent ends. No one was hurt.

On the 9th a train on the Grand Rapids & Indiana Railroad was thrown from the track by a land-slide near Paris, Mich., and the fireman and a brakeman were killed.

On the morning of the 10th a bridge over Saddle River, 1½ miles from Hackensack, N. J., on the New Jersey Midland Railroad, gave way under a mixed train of one passenger and two freight cars, besides engine and tender, moving at the rate of about 20 miles an hour. The engine fell into the river, which is shallow, and the passenger car and one freight car fell on it. A brakeman and one passenger were killed, and the conductor, engineer, fireman and 14 passengers injured, being three-fourths of all in the car. The bridge was a single span Post truss 70 feet long, and, it is reported, "has been considered imperfect and incapable of sustaining a heavy train." The road had been open only six weeks.

On the evening of the 11th an accommodation train ran into the head of another on the Pacific Railroad of Missouri, near Laclede station, damaging both engines, throwing a baggage car down a bank 30 feet or more high, and a mail and passenger car on the other side of the track, wrecking them badly. The baggageman was injured somewhat severely.

The locomotive of one of these trains exploded directly after the collision, scattering fragments for a long distance. The engineer and fireman had jumped off to avoid the collision, and no one was hurt by the explosion.

Very soon after these accidents a locomotive which was following one of the trains ran into the wreck, seriously injuring the engineman and breaking up the cars which remained on the track.

On the morning of the 11th, the locomotive "Atlas," attached to a freight train on the Boston & Albany Railroad, exploded at Grantville, Mass., causing the death of the fireman and a brakeman, and badly injuring the engineer.

On the afternoon of the 11th a locomotive attached to the afternoon train of the New Jersey Midland Railroad was thrown from the track by a broken axle near Pompton, seriously injuring the engine-man.

On the 12th the locomotive of a freight train on the Pittsburgh, Cincinnati & St. Louis Railway was thrown from the track near Bowerston, Ohio, by an obstruction supposed to have been placed on the track with criminal intent. The conductor had a leg and several ribs broken, and the engine-man and fireman were bruised.

On the 15th the rear section of a double freight train on the Grand Rapids & Indiana Railroad ran into the first section as it was standing at the station at Swan, Ind. The caboose car of the first section was destroyed, and the locomotive of the second section (a new one on its first trip) was badly damaged. No one was hurt.

On the 18th the rear section of a double freight train on the Lake Erie Division Baltimore & Ohio Railroad became detached from the locomotive about two miles north of Fredericktown, O., while descending a heavy grade. The engine at first got ahead, but the cars soon became unmanageable and ran down with great speed, so that the locomotive was run ahead and past the station where it should have stopped to keep out of its way, running into the rear of the first section of the train, destroying the caboose and part of one car and being badly damaged itself. No person was hurt.

On the 22d, near Parkersburg, W. Va., the boiler of a locomotive on the Baltimore & Ohio Railroad exploded, instantly killing the engineer, Milton Parker, and the fireman, Daniel Nelson, and injuring Michael Egan, a brakeman, so seriously as to cause his death in a few hours. The boiler was thrown 350 feet. Three cars were thrown into the creek on one side of the bank, while the tender and running gear of the engine were on the opposite side.

On the 23d a freight train going west on the St. Louis & Southeastern Railway was thrown from the track by reason of the spreading of the rails, "for want of proper fastenings," the report says. The most serious result was the delay of the train for about three hours.

On the 25th two freight trains on the Great Western Railway ran into each other near Suspension Bridge, "owing to a telegraph operator's blunder," the telegram says. Two engines and seven or eight freight cars were damaged.

On the morning of the 25th the two rear cars of the forward section of a double freight train on the Baltimore & Ohio Railroad broke off in a tunnel just east of Roseley's Rock. The rear section ran into these cars and they caught fire from its broken head-light, and both were destroyed, one being loaded with rosin, and the engine was also badly injured by the fire.

On the morning of the 26th, near New Moorefield, Ohio, on the Cleveland, Columbus, Cincinnati & Indianapolis Railroad, there was a collision between a gravel train and the Paymaster's train, both being "wild." One engine was badly injured, but no person was hurt.

On the 26th a freight train on the Iowa Division of the Illinois Central Railroad ran into a drove of cattle, which had run upon a bridge and got caught there, about three miles west of Ackley. The locomotive and three cars were thrown from the track.

To these accidents occurring in April we add one which occurred in March, information of which was received after our March list was printed. On the evening of the 30th a passenger train going west on the Erie Railway ran into a freight train headed east and standing at Blood's Station, on the Rochester & Corning Branch. One engine and several cars were badly injured but no person was seriously hurt. It is reported that "the freight train was running out of time and was not stopped at the proper station."

The accidents in April, 22 in number, may be classified as follows:

Head collisions	4
Rear collisions	5
Explosions	4
Breaking of bridge	1
Various derailments	8

Three of the rear collisions were caused, directly or indirectly, by the breaking of trains apart. Two of the derailments were occasioned by land slides, and one each by an obstruction placed maliciously, by cattle on a bridge, spreading of rails, broken axle, broken rail, and a sand drift. The casualties were 13 killed and 32 injured. Six were killed by explosions, three by collisions, two by the breaking of a bridge, and two by a landslide. Seventeen were injured in the accident by the breaking of the bridge, six by the broken rail, three by collisions, three by the malicious obstruction, and one each by wreck, explosion and broken axle.

Our record for the month of February contained accounts of 21 accidents; that for March, 27; this for April has 22. In February 18 persons were reported killed and 128 injured; in March, 9 killed and 67 injured; in April, 13 killed and 32 injured.

Car Ventilation.

On this subject a correspondent writes as follows to the *National Car Builder*, over the signature "Adams." We have made some comments on the letter in our editorial columns:

I have noticed, in several recent numbers of your journal, articles on the somewhat trite and threadbare topic of car ventilation; and, judging from the tenor of some of them, I cannot but think the writers are deficient in a practical knowledge of the real nature of the problem they are so anxious to solve. I do not undertake to say that ventilation is not required in railway cars, but, on the contrary, I am ready to admit that no place needs it more. I do protest, however, against the ventilation of so many crude and ill-considered suggestions and theories on the subject. The truth is, that railway cars are, as a general thing, provided with the means of securing more ventilation than is used or required. I do not travel as much, perhaps, as the correspondents, reporters, and others whose business it is to prepare articles for the newspaper press, and who are rather prone to take for granted everything they hear said about this subject, whether it involves mechanical principles or whether it relates to natural laws affecting the atmosphere. I have for many years been familiar with the operating of railroads, and especially with the construction of freight and passenger rolling-stock. My business frequently requires me to make trips over the road with which I am connected, and on these occasions I have often noticed, when passing through a train, that the air was close and stifling in some of the cars; but, on looking up, I noticed that the ventilators were all, or nearly all, closed. The means provided for renewing and purifying the air in the vehicle were not made use of, although they were quite sufficient for the purpose. The trouble in this and all similar cases is that the use and regulation of the ventilators are dependent partly on the caprice of passengers, and partly on the conductor and brakemen. This difficulty I would overcome by making all car-ventilators automatic in their working, because brakemen and conductors have their time too much occupied with other equally or more important matters to admit of their giving much attention to ventilation, especially if there is no complaint on the part of the passengers.

Many people have an idea that the means usually resorted to for the ventilation of a house or of a room are equally applicable to a railroad car. This, however, is a great mistake, as any one must see who gives the matter a little careful consideration. A house or a room is stationary. It is not constantly exposed to the cinders and dust which accompany a fast-moving train. The external air can be admitted in any way that is desirable, and the inmates can avoid the inflowing current or otherwise, as prudence may suggest. But a railroad train, moving at the rate of forty miles an hour, with every car crowded with passengers, sick, well and convalescent, young and old, rough and delicate, jolly and sober, and entertaining the most diverse and conflicting views about fresh air and ventilation—this, I submit, is entirely a different case from an ordinary dwelling-house. The bulk and rapid movement of the train causes a partial vacuum as it forces its way through the surrounding atmosphere, and this draws the cinders thrown out by the locomotive, and the dust from the track stirred up and set whirling by the onward rush of the train, and inclines both toward the cars; and whatever openings there are on the sides or roof of the cars to let in the air are sure to let in cinders and dust also, so that the annoyance of insufficient ventilation is rather increased than diminished, by admitting the fresh air combined with another enemy equally annoying.

To devise a plan of ventilation that will obviate all the difficulties alluded to is no easy matter. It is a problem yet to be solved; and so long as it remains unsolved, we shall doubtless have innumerable plans and devices presented by amateur mechanics and newspaper engineers, who take little account of the practical difficulties to be surmounted, and are consequently surprised to see so many of their theories come to grief when subjected to actual test.

I do not say that some improvement can not be made in the methods now in use. Little by little, the observation and experience of practical mechanics and scientific men will remedy what is now defective, although a perfect remedy may not, in the nature of the case, be attainable.

Western Union Railroad Report.

The sixth annual report of the Western Union Railroad Company, being for the year 1871, is published with the report of the Milwaukee & St. Paul Company, which holds a majority of Western Union stock. The more material portion of the report is given below:

The Western Union Railroad extends from Milwaukee and Racine, on Lake Michigan, to Port Byron, on the Mississippi River, 196 miles in length. By connecting lines, it is in connection with Rock Island and Davenport. That part of it from Eagle to Elkhorn gives it a direct Milwaukee connection.

The cost of the property represented by bonds and shares is as follows:

Mortgage bonds	$3,375,000
Shares	4,000,000
Total cost	$7,375,000
Cost per mile, say	$37,000.

Three million dollars of the mortgage debt bears but 3 per cent. interest until July, 1873, after which it, like all the other bonds, bears 7 per cent. interest.

COMPARATIVE STATEMENT.

	1870.	1871.	Increase.
Gross earnings	$766,937 85	$812,169 22	$75,131 37
Operating expenses	617,982 51	638,373 20	20,390 69
Net earnings	148,955 34	203,796 02	54,840 68
Interest on mortgage bonds	61,495 00	106,697 02	45,202 02
Miles of road (10 miles leased)	206½	206½	
Cost of road	$7,375,000 00	$7,375,000 00	
Cost per mile	37,000 00	37,000 00	
Tons of freight moved	203,328 00	234,867 00	31,539 tons.
Number of passengers carried	200,800	190,059	Dec. 10,741
Miles run by trains	441,565	521,712	Inc. 80,147
Cost per mile run	$1 40	$1 22	Dec. 18c.
Value of supplies on hand	57,893 57	75,342 73	Inc. $17,449 16
Gross earnings per mile	3,714 00	4,078 00	Inc. 364 00

The operating expenses are more than 80 per cent. of the receipts. The expenditures not charged to operating expenses amounted to $180,355.08, including $106,697.02 interest on funded debt, and $10,000 for use of track between Port Byron and Rock Island. The interest on the funded debt after July, 1873, will be $229,250 per year.

The company's rolling stock consists of 28 locomotives, 11 first-class passenger cars, one sleeping car, one business car, 4 baggage, mail and express cars, 8 baggage and second-class cars, 402 box freight and caboose cars, 32 stock cars, 35 flat cars, 51 coal cars, one derrick car and one pile derrick car.

Fast Time.

On Friday, May 10, Engineer James Wood ran a special train on the New York Central Railroad from Rochester to Syracuse, 81 miles, in 82 minutes.

RAILROAD GAZETTE

Published Every Saturday.
A. N. KELLOGG, *Proprietor.*
S. WRIGHT DUNNING AND M. N. FORNEY, *Editors.*
W. H. BOARDMAN, *Acting Publisher.*

CONTENTS.

ILLUSTRATIONS:	Page.	EDITORIALS:	Page.
Drilling Machine for Car-Truck Frames	209	The Milwaukee & St. Paul Report	215
Cooke's Improved Safety-Switch	212	EDITORIAL PARAGRAPHS	215
CONTRIBUTIONS:		NEW PUBLICATIONS	215
The Southern Route to the Pacific	209	CHICAGO RAILROAD NEWS	216
Train Dispatching	210	GENERAL RAILROAD NEWS:	
Mr. Quetil and the Narrow Gauge	211	Annual Conventions	215
The Sale of the Alabama & Chattanooga Railroad	212	Western Union Railroad Report	213
Light Railroads and Heavy Snows	212	Milwaukee & St. Paul Report	218
"S" and "Hindoo's" Train System	212	Elections and Appointments	216
EDITORIALS:		Traffic and Earnings	216
The American Society of Civil Engineers	214	Personal	216
Car Ventilation	214	Old and New Roads	216
		MISCELLANEOUS:	
		Train Accidents in March	213
		Car Ventilation	213
		Route of the Canadian Pacific Railroad	218

Editorial Announcements.

Address.—The RAILROAD GAZETTE *will be printed for the present in New York; our printing house in Chicago having been destroyed. All communications, therefore, whether editorial or business, should be directed to the New York office. The proprietor will receive subscriptions and advertisements at his office in Chicago, Nos. 63 and 65 South Canal street, but letters should be addressed to New York.*

Correspondence.—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Inventions.—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

This society more than any other in this country resembles its prototype, the Institute of Civil Engineers of Great Britain. The standard of qualifications for membership is more rigid and exacting than is required by any other similar society in this country. At the same time, membership is not confined to any single class of engineers, or to those engaged in any special department of the profession. It may therefore, with some justice, claim to be the leading engineering association of the country, and with its companion society, the Civil Engineers' Club of the Northwest, it promises to become an association which will ultimately establish a position and give a recognizable rank to the profession of engineering in this country, which, we are obliged to confess, has thus far been of a somewhat indefinite character. This becomes more and more important each year, as the engineering works which are projected and constructed increase in magnitude and expense. While it may be quite safe to set a novice to work to construct a temporary wooden traffic-shed for a new railroad, or to locate a line through a country presenting few engineering difficulties, it is found that the blunders of inexperience in the construction of depot buildings involving an expenditure of millions, and the miscalculations in the location of transcontinental railroad lines, are many-fold more expensive than the services of the ablest men. We are, of course, prepared for the sneers of our friends who take pride in being "practical men," and who take a malicious pleasure in speaking of the more progressive members of the profession as "kid-glove" engineers. We grant, too, that there is often some ground for the sneer, and that there are men claiming to be engineers who, well up in all the training which books can give, are nevertheless sadly deficient in that still more severe and important and valuable experience which actual contact with hard facts and the doing of work gives. But after we admit all this, a little careful and intelligent observation will show that the most successful engineering work done in the country was projected and designed by men well informed in the knowledge which is learned from books and which the schools can teach, and whose theoretical knowledge was quite equal to their practical experience; and that the blunders and useless expenditure of money have quite as often been made by the "practical men" without theoretical knowledge as by the "theoretical men" without practical experience. In bridge-building this has been quite marked. There is a certain stern element about the laws of statics that resembles inexorable justice, and which visits with failure and condemnation all ignorant trifling with its laws; and bridges and roofs often have an unfeeling way of tumbling down, which is much more regardless of the reputations of their projectors than it is possible for an editor of a technical paper to be. As works of this kind increase in magnitude, therefore the demand for thoroughly able men increases; and in proportion to the amount of money to be expended in such work, it grows important that it should be disposed of wisely. Capitalists are proverbially slow in recognizing the difference in worth between good and bad work, the value of which is, at first, only of an ideal character; but there are indications that they begin to see that it is unsafe to open their money-bags and allow incompetent men to dispense their contents.

To all, therefore, who are interested in making engineering in this country one of the learned professions, the society to which we have referred and its proceedings must have great interest. Its members are scattered from the Atlantic to the Pacific, and from Canada to the Gulf, and among them are such well-known names as that of the President, Mr. Horatio Allen, A. W. Craven, Wm. J. McAlpine, Charles Paine, E. S. Chesbrough, Capt. James B. Eads, A. J. Cassatt, Joseph D. Potts, Col. J. W. Adams, W. Milnor Roberts, Jas. B. Francis, Albert Fink, Washington A. Roebling, Gen. J. G. Barnard, Samuel J. Rivers, etc.

If we consider the intimate relation which exists between the work in which these men are employed and the material prosperity of society, it is somewhat surprising that the influence which can be exerted by the members of this profession is not greater than it now is. Should we enter into a consideration of the causes of the present condition of things, we should be brought face to face with some very disheartening facts, which we do not care to consider now. It is, however, a good omen that the members of this profession have organized themselves together, and it is to be hoped that such an organization will not only help to advance the profession of engineering considered from a scientific point of view, but that it may become a nucleus of power to reform some of the financial practices which are now so common, and which only language which would be offensive would be adequate to describe. However, as we have already intimated, it is not our purpose to discuss these now. The society will obviously have enough to occupy its time if it considers scientific questions alone, and does somewhat to raise the standard of knowledge of those who are to be actively employed in the practice of the profession which it represents. Whether fortunately or unfortunately, in this free country any man can call himself almost anything which he chooses, and there have been probably very few surveying parties whose members were not all "engineers," from chainman up. Those who are at all in earnest in their profession, and who have given their time and much study to it, have been for a long time looking anxiously for a recognition, by those who hold the money-bags, of the fact that a twelve-hundred dollar engineer on any important work is very apt to be a more expensive man than a twelve-thousand dollar man. While we believe it to be impossible for any society to establish a standard of knowledge for engineers, nevertheless, when able men in any profession co-operate, it has always a tendency at least to silt out the humbugs and raise the position of the men of real ability. This we believe is one of the results which can be accomplished by the American Society of Civil Engineers. For this reason, therefore, if for no other, the annual convention which will be held in Chicago next month must have great interest to engineers generally, whether members or not, and the proceedings at that time will be sharply criticised by those most interested in having them come up to what they conceive should be the standard of engineering in this country.

The following announcement will therefore have much interest to many of our readers:

AMERICAN SOCIETY OF CIVIL ENGINEERS.

The annual convention of this society will be held in Chicago on Wednesday and Thursday, June 5 and 6.

The Eastern members will leave New York on Saturday, June 1, by the morning express on the Erie Railroad, and stop at the Cataract House, Niagara Falls, over Sunday; leave Buffalo on the morning express over the Lake Shore & Michigan Southern Railroad; stop at the Kennard House, Cleveland, Monday night, and, on Tuesday morning, leave Cleveland so as to reach Chicago Tuesday evening. Free transportation over these lines for the trip to Chicago and over the Pittsburgh, Fort Wayne & Chicago, and Pennsylvania Railroad has been provided for members by the courtesy of Gen. A. S. Diven, Vice-President Erie Railway; Mr. Charles Paine, General Superintendent of the Lake Shore & Michigan Southern; Mr. J. N. McCullough and A. J. Cassatt, General Managers of the Pennsylvania Railway.

The proceedings of the convention and the subsequent movements of the excursion party are not fully decided upon.

Papers are announced as follows:

On the Fellowship Fund of American Society of Civil Engineers, by A. P. Boller, of New York.

Sketch of Plans and Progress of the Detroit River Tunnel, by E. S. Chesbrough, Chicago.

Electro Science as a Part of the Education of Civil Engineers, by Stephen Chester, New York.

Loads and Strains of Bridges, by Thomas C. Clarke, Philadelphia.

Notes on the East River Bridge, by T. Collingwood, New York.

Notes on Blast Furnaces, by Casimir Constable, New York.

Selection of Stone for Masonry, by G. B. Eichbaum, of Louisville, Ky.

Construction of Public Works, by H. Earnshaw, Cincinnati, O.

Manufacture of Coke from Illinois Coal, and the Power Employed in Purifying Slack Coal, by H. L. Lübers, East St. Louis, Ill.

An Account of the Construction of the Illinois & St. Louis Bridge, by Walter Katte, St. Louis.

Engineering, by W. Milnor Roberts, New York.

Results Obtained from Blast Furnaces of a Large Size, by E. N. K. Talcott, Dover, New Jersey.

Closing Breaks under Difficulties, by O. T. Whitford, Owego, New York.

Steam Boiler Explosions, by James A. Whitney, New York.

Cements, by Edmund Yardley, Altoona, Pa.

These and other papers which it is expected will be presented will be read during the session of the convention.

This society will meet with the Civil Engineers' Club of the Northwest in Chicago, who have secured the city council chambers, in which the sessions of the convention will be held. It will meet on Wednesday, at 11 o'clock a. m.

Mr. Robert Harris, General Superintendent of the Chicago, Burlington & Quincy Railroad, has offered the society free passes to Omaha, St. Joseph, Leavenworth and Kansas City and return. Mr. O. B. Greene has offered the society an excursion on Lake Michigan. Mr. John Newell, President of the Illinois Central Railroad, has placed at the disposal of the society facilities for a trip to St. Louis and return.

J. H. Linville, President of the Keystone Bridge Company, and Springer Harbaugh, of the Superior Rail Mill of Pittsburgh, have extended an invitation to the members of the society to visit their works.

The following committees have been appointed: On Invitation, Messrs. Horatio Allen, A. W. Craven, Thomas F. Rowland. On Transportation, Alfred P. Boller, Robert N. Brown (of Buffalo), Charles Macdonald and Felicien Slataper (of Pittsburgh). On Arrangements, Messrs. E. S. Chesbrough (of Chicago), Charles Paine (of Cleveland), M. N. Forney (of New York), also the President and Vice-Presidents of this society, Messrs. Horatio Allen, Jacob M. Clarke and Julius W. Adams. The Secretary is *ex officio* a member of these committees.

Over sixty members have thus far signified their intention of joining the excursion, and the meeting promises to be of great interest and, it is thought, profit to all who will attend.

Car Ventilation.

On another page we reprint a letter published in the *National Car Builder*, in which the writer expresses his contempt for some of the nonsense which is written on this subject. There are undoubtedly many "crude and ill-considered suggestions and theories" expressed on the subject. We are disposed to believe, however, that the writer of the letter referred to is not quite as clear in regard to this subject as he might be, and the precise object which he had in view when he wrote it is not very obvious. He says in one place: "The means provided for renewing and purifying the air * * * are quite sufficient for the purpose;" and further on, "a plan of ventilation that will obviate all the difficulties * * * is a problem yet to be solved." Now we must insist that *if* the provisions for ventilation are *quite sufficient* in one case, the problem *has* been solved. The fact is, however, that the ordinary provisions for ventilation are not sufficient. If, as "Adams" says, passengers are ordinarily indifferent or averse to having a sufficient supply of fresh air, then, as he suggests, the ventilation should be "automatic," which ordinary ventilators are not; and therefore the ordinary provisions are not "sufficient." One of the elements which must be taken into account in devising a system of ventilation is the indifference of some and the aversion of other travelers to fresh air, and therefore it must be supplied to a car in such a way that these will be unconscious of it, and the appliances at the same time be automatic in their action. If the fresh air causes any discomfort by creating a cold draft, or if its supply is in any way dependent on the volition of either the passengers or the employees, there will be loud complaints in the one case or neglect in the other. A system of ventilation for railroad cars should therefore fulfill the following conditions:

1. It should *supply* the requisite quantity of fresh air to the passengers, and exhaust an equal quantity of that which is impure.

2. The air should be admitted into the car in such a way as not to cause discomfort to any one, and, as far as possible, without the knowledge of those who do not value pure air.

3. The supply should not be dependent on the volition of either passengers or employees.

4. The temperature should be uniform in every part of the car.

It is of course difficult to fulfill all these conditions perfectly, but the arrangement which we now think would come the nearest to doing so is a modification of that which is now used on the Harlem, Erie, New Jersey and some other roads, which is simply a ventilator over each door of the car, the opening to which is over the plat-

form on the under side of the projecting roof, and is protected by a wire netting to exclude sparks; although it is doubtful whether the latter serves any useful purpose. The difficulty with the arrangement as now used is, that the swinging door of the ventilator is very apt to be closed and kept so. In place of this door we would suggest the use of a Venetian blind with fixed slats inclined upward *from* the outside, so that the current of air as it enters would be directed upward, and thus be distributed through the cars before it reaches the passengers. This arrangement would admit the air at the front end of the car, and exhaust it at the back, and at the same time, by being directed upward, it would be so diffused and mixed with the warm air that no one would be conscious of a "draft," of which so many persons stand or sit in mortal apprehension.

The Venetian slats would also have the advantage of excluding the light, and therefore very few would know that the ventilators were open, and being fixed, no son of a salamander could close them. In addition thereto the ordinary ventilators could be used for warm weather, or as the inclinations of the passengers might suggest.

Any one disposed to experiment with our suggestion can easily do so in almost any car, simply by opening the end windows next the stoves and closing the ordinary blinds. In a crowded car the influence on the atmosphere will be felt in a few minutes. In dusty weather, however, a great deal of dust will be admitted by the windows, which will not be the case with the ventilators over the doors—or at least very much less dust will enter through them than by the windows.

We know that, in making these suggestions, they are open to the imputation of being "the plans and devices of a newspaper engineer," which, judging from the way "Adams" speaks of them, must be very bad indeed. However, we suppose he won't mind, if our devices work well. In the meanwhile we hope he will answer satisfactorily to himself the following questions:

1. How much fresh air should be supplied to each passenger per minute?

2. By what apertures is the requisite quantity of air to *enter?*

3 How is the same amount of impure air to escape?

4. With the thermometer below zero, or in dry and dusty weather, would the admission of the quantity of air required and by the means proposed cause discomfort to the passengers?

5. Are his proposed devices automatic?

6. Is it not possible that a "newspaper engineer" may have observed and thought of some things which never occurred to him?

If the correspondent of the *Car-Builder* will honestly and carefully consider and answer these questions, we believe he will then not only understand the subject of ventilation more thoroughly, but will think more favorably of engineers who only write about and ride in cars, but do not build them.

The Milwaukee & St. Paul Report.

The Milwaukee & St. Paul Railway Company, a summary of whose report for 1871 we publish elsewhere, has a system of railroads which ranks among the most extensive in the country. At the close of the year it owned 1,018 miles of road and operated under long leases 171 miles more; while it owned a majority of the stock of the Western Union Railroad Company, thus controlling directly 196 miles more of road, with which is used ten miles of another company's track. Its system thus under one management included fifteen lines and branch lines measuring 1,395 miles in length. Since that time it has purchased one of its leased lines, 103 miles long, has made contracts for the extension of another 27 miles, and has provided for the construction during the present season of two new lines, one 30 miles and the other 85 miles long. Thus it will soon own 1,236 miles of road and operate under leases 95 miles more.

This great system of roads covers a large part of Wisconsin, a small part of Iowa and the wealthiest section of Minnesota, a territory whose chief products for export are wheat and lumber. The average earnings per mile of the system are not large, and a large number of companies with earnings as large never succeed in making dividends; but the operating expenses are kept well down—being for 1871 only 57½ per cent.—and the capital account is not extravagant; so the past year, when the receipts were considerably smaller than usual, the company divided 7 per cent. on the preferred stock and expended in permanent improvements what was equivalent to about 6 per cent. on the common stock.

The capital stock of the company is at the rate of about $22,250 per mile, of which a little less than half is preferred. The bonded debt is at the rate of $17,830 per mile, about one-fourth bearing 8 per cent. interest, one-fourteenth 7.3 per cent., and the balance 7 per cent.

The company's system heretofore has been seriously defective for want of a railroad outlet to the East. It is not that Milwaukee is not a good or even the best market for the largest part of the products of the country on the line of the Milwaukee & St. Paul system, but that the only *rail* outlet to the East from that city was in the hands of its rival, that has made it essential to the company's independence that it should have a line to Chicago. But the relations of the towns on its lines with Chicago, whose business relations with all the Wisconsin and Minnesota towns are becoming more and more intimate, have been an additional and a very powerful argument in favor of the construction of the company's new line from Milwaukee to Chicago. With it the company can give all shippers on its lines the choice of either the Milwaukee, the Chicago or the Eastern markets, and will be able to compete with its great rival, the Chicago & Northwestern, for the traffic which heretofore the latter could secure without an effort. To the bystander it seems that it would have been much more economical for both companies if they had agreed upon terms by which the Milwaukee & St. Paul might have had the use of the Northwestern's line from Chicago to Milwaukee either at a fixed rental or in exchange for parts of its line which the Northwestern would like to use. It is understood that negotiations were held on this subject, but that the two companies could not agree. Now it seems quite likely that, while the St. Paul will have an outlet to Chicago, the Northwestern will have a line from Milwaukee westward, with which it will be able to do a Milwaukee as well as a Chicago business from Minnesota and Western and Central Wisconsin.

Annual Conventions.

The American Society of Civil Engineers will hold an annual convention in Chicago on the 5th of June.

The American Railway Master Mechanics' Association will hold its annual convention in Boston on the 11th of June.

The United American Railway Master Car Builders' Association will hold its annual convention in St. Louis on the 12th of June.

THOMAS A. SCOTT is said to be the choice of those who control the stock of the Erie Railway Company for their President for the next year. Mr. Scott's experience with the Union Pacific may have encouraged them in their selection. He went in with the shares worth less than 20 and when he retired they were worth about 40, though prospects of dividends were almost infinitely remote. But he can hardly expect any such appreciation in Erie during his administration, the fact being that the shares are already enormously high—at least in comparison with the prices before the retirement of Gould—and the honest earning of money enough to pay a dividend on the common shares seems very improbable. But one thing Mr. Scott's election would make pretty sure, and that is that there would be no enormous reduction of rates for several months of the year such as there has been heretofore for two or three years. At least all such "breaking of rates" have always been charged upon the Erie, which, not having the connections in the West which the other lines had and have, and which are possible only to roads with the standard gauge, has sought to attract traffic by making concessions in rates; and when it had done this until the patience of the other companies was exhausted, they would underbid it and put the rates so very low that it, being the poorest, in the course of a few months would be distressed; when rates would be renewed and pretty well maintained. Now if Mr. Scott shall accept the presidency of the Erie at all, we imagine that it will be more for the sake of maintaining steadiness in the rates than for any expectation of making anything worth his while out of Erie directly. If he—or another—will so manage this and the other lines that there shall be no great fluctuation of rates without rhyme or reason, he will be doing the community good service, unless this uniformity be accompanied by a considerable advance in the *average* rate. We believe that the average rate of the past two years is abundantly sufficient, and that with it traffic will be sure to grow rapidly and increase continually the receipts of the different lines. Certainly the New York Central and the Pennsylvania have had no reason to complain of the results of their operations; and there can be no reason why rates should be so advanced as to make dividends on all the shares the Erie presses have printed for years past. The great field for reform in the Erie is in reducing the operating expenses; and if Mr. Scott is as successful in this as he was on the Union Pacific, he will make a revolution indeed.

THE STANDARD GAUGE is about to invade the system of the Grand Trunk of Canada. The chairman at the recent half-yearly meeting announced that the directors intend this season to reduce the gauge on the line from Buffalo to Stratford, and lay a third rail from Stratford to Sarnia, so as to establish a line of 4ft. 8½in. gauge from Buffalo to Detroit, the company's line from Detroit to Port Huron being of that gauge. Then cars of the standard gauge running between New York and Chicago can pass over this line.

Once having begun the change, it is doubtful whether the company will stop, as most of the new lines in Canada are of the standard gauge, and the necessity of connecting with them as well as with the great and growing system of railroads in the United States becomes greater yearly. Having begun, also, it will be possible to provide the standard-gauge rolling stock (the chief and only considerable expense of changing) gradually, as the old wears out. Of thirty new locomotives ordered for this year by the company, twenty are to be of the American standard gauge. A considerable stock of freight and passenger cars is ordered for this line, and with it the company will be able to compete better than ever before for a share of the through traffic between New York and Chicago.

The Great Western of Canada has now the standard gauge on all its lines; the new "North Shore Railway," and most of the new lines in the Dominion, with the exception of the Intercolonial, are to be of this gauge; and a strong effort is being made to have the Intercolonial, which has little or no track laid, though much of the grading is done—laid with the 4ft. 8½in. instead of the 5ft. 6in. gauge.

THE EFFECT OF COLD ON IRON, concerning which much diversity of opinion exists, is illustrated pretty forcibly by the experience of the Grand Trunk Railway of Canada, which is exposed to severe cold and a great deal of it. At the recent half-yearly meeting of the company in London the President said that from 3,500 to 4,000 rails on the line *break every winter!* But he found comfort in the fact that in about 110 miles of steel track only eight or ten rails have broken. It was feared when Bessemer rails were first introduced that their resistance to wear would be counterbalanced by unusual liability to break, and that they would be especially dangerous in severe climates, the impression being apparently that having something of the hardness of cast iron they had also something of its brittleness. This experience of the Grand Trunk, however, indicates that they are especially fitted for such climates.

THE GENERAL TICKET AGENTS' ASSOCIATION held a special meeting in St. Louis on the 7th and 8th inst. for the purpose of making divisions of new through rates of fare recently established. Twenty-nine members were present, the work concerning chiefly those roads having stations in or immediate connections with St. Louis, Indianapolis, Louisville, Cincinnati and Nashville.

NEW PUBLICATIONS.

The American Artisan, a general technical journal, which is doubtless pretty generally known to our readers, will be published hereafter by Brown & Allen, who succeed the late firm of Brown, Coombs & Co. The new member of the firm is Mr. Leicester Allen, who has been for some years one of the editors of the *Scientific American*. Mr. Allen is to have the editorial management of the *Artisan*, and the firm promises considerable and substantial improvements in the paper, which has been heretofore a very handsome sheet.

Fernon's Fortnightly.—The first number of this new periodical, whose prospectus we noticed recently, is now published. When we say that it is unique in its character and design we will probably only say what many others say and all think. Indeed, we hardly know how to describe it, and will at once confess that the curious reader will do well to trust very little to what we may say and get a copy for his own inspection. Mr. Fernon, as we have said before, was for twelve years editor of the *United States Railroad and Mining Register*, at one time President of a Pennsylvania railroad, and has been familiar almost from the beginning with the history, public and private, of the Pennsylvania railroad corporations—and, indeed, to a considerable extent, with those of the whole country. He evidently has a mind of his own, and he does not always admit that a thing ought to be so because it is so and because those whose interest it is to have it remain so are rich and powerful. This first number of *Fernon's Fortnightly* contains 32 small quarto pages, each a little more than half as large as a page of the *Gazette*. It contains no advertisements whatever, unless we may call the remarkable prospectus of the *Fornightly* on the last page an advertisement. But announcement is made that advertisements will be published hereafter.

As to the field of this new journal, that may be gathered from this *resume* of the original articles in it, which cover eleven or twelve pages. First, under the head of "Editorial Correspondence," dated at New York, is an article in which the New York Central & Hudson River, the Pennsylvania Railroad, and the United Companies of New Jersey are discussed and compared and something is said of the coal supply of New York, and the coal-carrying railroads in their relations to New York and Philadelphia. In this letter the Pennsylvania Railroad is criticised with some severity. The "Salutatory" promises nothing, except to make the *Fortnightly* a "Chronicle of the Times, with notes and comments," which certainly leaves the editor with margin enough to say what he pleases on any subject. A long article entitled "Philadelphia and her Railroads, her Jobbing and Importing Trade," will be of local interest at least. "Investors of Money and their Perils" discusses the comparative desirability of stocks and bonds, of railroad, bank and insurance stocks as investments. "Canal traffic between Philadelphia and New York" calls attention to the importance of the traffic on the Delaware River, as well as on the Delaware & Raritan Canal. "The Erie Railway Company's Record, the penalty of a Wide Gauge and Bad Management," gives a history of the Erie, and of the results of its operation. A sketch of the financial history of the Atlantic & Great Western is given, in which attention is called to some extraordinary charges in the original construction account.

The selected articles, many of which have some comments, are of varied character, such as a list of stockholders and financial statement of the East River Bridge Company, the report of the iron product of the United States, Fortifications of Paris in the Siege, the Mechanical Cause of Ebullition, the report of the Committee of the Iron and Steel Institute of Great Britain on Danks' puddling machine, some extracts from the "American Counter-case," as presented before the Geneva Board of Arbitration, etc.

The prospectus on the last page which we have spoken of as "remarkable" should not pass without notice. About half-a-dozen lines of it refer to the *Fortnightly*, with a modest reference to the qualifications which the experience of the editor may

have given for his work, while the rest of the page contains a history of the world in miniature, beginning with the creation, and going down through the deluge, the history of the Jews, the birth of Christ, the fall of Rome, the Crusades, the Reformation, and all the rest.

But however eccentric some of these things may seem, the paper as a whole bears the mark of a distinct individuality, exceptionally well informed on many matters respecting transportation and material progress, clear and positive in style.

Fernon's Fortnightly is published simultaneously in New York and Philadelphia, the subscription price being five dollars per year. The office of the editor and proprietor, Mr. Thomas Sargent Fernon, is at No. 727 Walnut street, Philadelphia.

Chicago Railroad News.

Chicago & Northwestern.

This company has just issued a circular which advertises the fact that excursion tickets from Chicago to Lake Superior and return will be sold during the season of navigation for $35 each. The company has the advantage of being able to offer three different routes, and also of being able to take excursionists over new country, from the commencement to the end of the trip. The trip will be varied by steamboat rides on Green Bay and on Lake Superior, while the route from Duluth is to St. Paul and from the latter city either to Prairie du Chien or to Winona by rail, or from St. Paul to Dunleith by steamer on the Mississippi. The inducements offered, and the certainty that the trip will be healthful and pleasurable during the heats of summer, will be likely to make these excursion routes very popular during the warm season.

Chicago, Rock Island & Pacific.

A slight change in the time of the arrival in this city of the mail train has been made. It now reaches this city at 4 p. m. instead of 4:10 as formerly. The Peru accommodation train leaves the city at 5 p. m., and arrives at 9:30 a. m. On Monday, the 13th inst., the company commenced running two through trains to Leavenworth, Kansas, connecting, in that city, at the Union depot, with the Kansas Pacific and the Missouri Pacific. The Atchison Branch, which it was supposed would be completed to that city by the 15th of May, will not be ready for opening until about the first day of June.

Michigan Central.

Mr. Joy, President of this company, has purchased 18,000 tons of steel rail, mostly English, from Brown's and the Barrow Works, which are to be laid this season on the main line of the road. It will largely take the place of the iron rail on that portion of the road; it being contemplated to remove the comparatively new iron rail, as well as that which is much worn, and to put the iron rail down on the Michigan branches, where the wear and tear is proportionally very much less than on the main line between this city and Detroit. Of the steel rails mentioned above, 12,000 tons were purchased last fall before the price of iron advanced, and recently arrangements have been made for 6,000 tons more. Both the passenger and freight traffic on this road are considerably larger now than for the corresponding time last year.

By a recent change of time, what was formerly commonly known as the Kalamazoo accommodation leaves Chicago at 3:30 p. m., instead of 4:10, and daily, instead of six days in the week. Moreover, the train runs through to Jackson as well as Kalamazoo, and has a car for St. Joseph as heretofore.

The New York express leaving Chicago at 9:00 a. m., now has an elegant Pullman drawing-room car attached, which runs through as far as Rochester. At New Buffalo, now, this train connects with a train on the Chicago & Michigan Lake Shore Railroad for Grand Rapids, Muskegon, Pentwater, etc., and at Jackson with a train on the Jackson, Lansing & Saginaw Railroad for Lansing, Saginaw, Bay City, etc.

The Atlantic express, leaving Chicago at 5:15 p. m., now connects with a train on the Suspension Bridge Branch of the Erie in time to reach Buffalo at 2:40 p. m. Besides the Pullman and Wagner sleeping cars which run through with this train from Chicago to New York, a Pullman hotel car is attached, which runs through from Chicago to Niagara Falls and Rochester.

Illinois Central.

The company makes the following statement of receipts for the month of April, 1872:

LAND DEPARTMENT.

Acres construction land sold	2,962.42 for	$27,470.88
Acres free lands sold	681.42 for	7,202 20
Total sales during the month of April, 1872	3,649.84 for	$34,673.08
Total of all	3,649.84 for	$34,673.08
Cash collected in April, 1872		$64,981.34

Estimated Earnings—Traffic Department.

	In Illinois 707 miles.	In Iowa 402 miles.	Total 1109 miles.
Freight	$284,784 00	$54,252 00	$339,035 00
Passengers	99 007 75	39,144 90	138,152 65
Mails	6,375 00	3,059 34	9,434 34
Other sources	59,625 00	1,740 66	61,365 66
Total, April, 1872	$449,790 75	$98,196 90	$547,987 65
Total actual earnings, April, 1871	511,467 17	108,760 82	620,227 99
Decrease	$61,676 42	$10,563 92	$72,240 34

This is a decrease of 12 per cent. on the Illinois lines, of 9¾ per cent. on the Iowa lines, and of 11⅝ per cent. on the entire mileage.

Chicago & Michigan Lake Shore.

The Chicago & Michigan Lake Shore Railroad is now completed to Pentwater, Mich., and in connection with the Michigan Central through trains are now run twice daily between Pentwater and Detroit *via* Jackson and Pentwater, and Chicago *via* New Buffalo. Pullman sleeping cars are attached to night trains and elegant coaches to day trains. That leaving Chicago at 8:30 p.m. reaches Grand Rapids at 6.30 a.m., and Pentwater at 10:15 a.m., giving the most direct connection with the great lumber district on the east shore of Lake Michigan.

Lake Shore & Michigan Southern.

The officers and employees of this road have presented Mr. Charles F. Hatch, the late Superintendent of the road, with a valuable gold hunting case watch and a set of solitaire diamonds for Mrs. Hatch. The former has written a letter of acknowledgment and thanks. The letter of the officers and employees of the Lake Shore & Michigan Southern Company, and the reply of Mr. Hatch, have been neatly printed for circulation among Mr. Hatch's friends.

Chicago & Pacific.

The Common Council has been at work for several weeks in the attempt to agree upon a route for the admission of this company's road into the city. It is quite probable that the ordinance fixing the route within the city, as heretofore described in the GAZETTE, will be passed.

Chicago & Iowa.

Until the injunction mentioned last week, brought against this company by the Chicago & Northwestern Company, shall be dissolved, the company will be prevented from establishing its through line of passenger cars between this city and Dubuque.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

—The Harrison Branch Railroad Company of Ohio, whose road forms a part of the White Water Valley Railroad, held its annual meeting May 6, and elected the following directors: D. A. Dwight, J. C. Butler, H. M. Britton, Chapman Dwight, H. Prentiss, W. C. Perkins and William Dwight, Jr. The directors have chosen D. A. Dwight, President, and H. Prentiss, Secretary and Treasurer.

—Mr. John B. Norris, of the firm of Greenleaf, Norris & Co., New York, has been chosen President of the Vineland Railroad Company.

At the annual meeting of the Central Railroad Company of New Jersey, May 10, the following were chosen directors: John Taylor Johnston, John C. Green, Adam N. Morrie, New York; Benjamin Williamson, Elizabeth, N. J.; Frederick T. Frelinghuysen, Newark, N. J.; Henry D. Maxwell, Easton, Pa.; Sidney Dillon, James Doorman Johnson, and Moses Taylor, New York.

—Orlo L. Walcutt has been appointed Commissioner of Railroads and Telegraphs for the State of Ohio, in place of R. D. Harrison, deceased.

—The Junction Railway Company, which is to construct the Ohio section of the Toledo Branch of the Canada Southern Railway, on the 24th ult. chose the following directors: Milton Courtright, of Erie, Pa.; Sidney Dillon, of New York; J. S. Casement, of Painesville, Ohio; Robert Cummings, C. A. King, G. W. Davis and C. B. Phillips, of Toledo. President, General J. S Casement; Vice-President, C. A. King; Secretary and Treasurer, C. B. Phillips.

—The following were chosen directors of the Kansas Pacific Railway Company at the annual meeting, May 2, 1872: Robert E. Carr, Adolphus Meier, John D. Perry, Carlos S. Greeley, S. M. Edgell, B. W. Lewis, Jr., Wm. M. McPherson, St. Louis, Mo.; Wm. Thaw, Pittsburgh, Pa.; Thomas A. Scott, Matthew Baird, Philadelphia, Pa.; John McManus, Reading, Pa. All these were members of the old board. The following officers were re-elected: Robert E. Carr, President; Adolphus Meier, Vice-President; Carlos S. Greeley, Treasurer; Chas. B. Lamborn, Secretary.

—At the annual meeting of the stockholders of the Vicksburg & Meridian Railroad Company, held in Vicksburg on the 6th of May, the following officers and managers were elected for the ensuing year: President, Morris Emanuel; Vice President, Thomas Rigby; Treasurer and Secretary, N. G. Bryson; Managers, M. Emanuel, P. Anderson, Thomas Rigby, W. Crutchet, A. B. Reading, Wm. E. Morris, John A. Klein, Thomas M. Smedes, Thomas S. Dabney, Jas. R. McDowell, J. C. Stanton.

—Thomas Dorwin has been appointed General Passenger Agent of the Missouri, Kansas & Texas Railway.

—R. W. Chase, late Assistant General Freight Agent of the Vermont Central Railroad, has been appointed General Freight Agent of the Northern Pacific, with headquarters at Brainerd, Minn.

—A. W. Dickinson has been appointed Superintendent of the Western Division of the Pacific Railroad of Missouri, which includes the section between Holden and Sedalia and the Sedalia & Lexington Branch.

—P. E. Wilson has been appointed Superintendent of the Iowa Eastern Railroad.

—Andrew Watson, Superintendent of the Jackson, Lansing & Saginaw Railroad, has accepted an appointment as Superintendent of the Detroit & Milwaukee Railroad, in place of Thomas Bell, resigned.

—W. E. Jones has been appointed Western Passenger Agent of the St. Louis, Vandalia, Terre Haute & Indianapolis Railroad, in place of Thomas Dorwin, who has accepted an appointment as General Passenger Agent of the Missouri, Kansas & Texas.

—At the annual meeting of the Indianapolis & Vincennes Railroad Company in Indianapolis May 9, the following were chosen directors: Thomas A. Scott, Philadelphia; William Thaw, Pittsburgh; George B. Roberts, Philadelphia; T. D. Messler, Pittsburgh; D. S. Gray, Columbus; W. P. Shinn, Pittsburgh. The first named was chosen President.

—At the annual meeting of the Houston and Texas Central Railroad Company in Houston, Texas, May 6, the following were chosen directors: Wm. E. Dodge, Moses Taylor, New York; Wm. M. Rice, W. J. Hutchins, Paul Bremond, A. Groesbeck, C. Ennis, W. R. Baker, A. J. Burke, T. W. Pierce and T. M. Shirley. Of these, Messrs. Dodge, Taylor, Ennis and Hutchins are members of the Houston & Great Northern directory, and nearly all were in the old directory.

—There was an election at Little Rock, Ark., May 7, for four new directors of the Cairo & Fulton Railroad of Arkansas. The following gentlemen were chosen: Thomas Allen, St. Louis; George C Ward, New York; W. R. Donaldson, St. Louis, and James M. Loughborough, St. Louis. The board is composed of thirteen members.

—J. W. Philbrick has been appointed General Master Mechanic on the Maine Central Railroad, with superintendence of all the shops of the company; John F. Merrill takes Mr. Philbrick's place in the Waterville shop.

TRAFFIC AND EARNINGS.

—The receipts of the Grand Trunk Railway of Canada for the week ending April 20 were: 1872, £38,200; 1871, £30,700; increase. £7,500, or 25 per cent.

—It is unofficially reported that the earnings of the New York Central & Hudson River Railroad for the month of April were $2,247,000, or about half a million more than for the corresponding month last year

—The receipts of the St. Louis, Kansas City & Northern Railway for the first week of May were: 1872, $70,-556; 1871, $48,250; increase $22,306, or 46¼ per cent.

—The following are the comparative earnings of the Central Pacific Railroad:

For the month of April, 1872	$951,200
For the month of April, 1871	720 929
For the month of April, 1870	633,753
Increase this year over 1871	230,271
Increase this year over 1870	317,412
Earnings first four months 1872	2,991,021
Earnings first four months, 1871	2,357,365
Earnings first four months, 1870	1,929 370
Increase this year over 1871	633,656
Increase this year over 1870	1,061 651

The increase for April, 1872, over 1871 is 32 per cent., and over 1870 50¾ per cent. The increase for the four four months in 1872 over 1871 is 27 per cent., and over 1870 55 per cent.

—The earnings of the Kansas Pacific Railway for the month of April are reported as $320,534.38.

PERSONAL.

—Mr. James D. Reid, who recently retired from the editorial charge of the *Journal of the Telegraph*, drew up the first code of rules for the management of telegraph lines, aided in opening the first commercial telegraph office, and was the first superintendent of the first commercial telegraph company. Mr. Fred. J. Grace succeeds Mr. Reid as editor of the *Journal of the Telegraph*.

—William B. Chamberlain, brother of Selah Chamberlain, and himself a well-known railroad man, died at New Philadelphia, O., on the 1st, having been accidentally kicked in the bowels by a playful horse.

—J. L. Taylor, General Freight and Ticket Agent; J. T. Johnson, Chief Clerk; C. Thatcher, Assistant Engineer, and J. D. Gunn, Master of Transportation, have retired from their respective positions on the St. Joseph & Denver City Railroad.

—Mr. E. D. Hammond has resigned his position as Secretary of the Ohio & Mississippi Railway Company, in whose service he has been for sixteen years, intending to rest for a time with the hope of recovering health and strength for future work.

OLD AND NEW ROADS.

Portland & Ogdensburg.

On the 7th the directors made a contract with Messrs. Fuller & Harding, of New York, for the completion of the road from North Conway through the White Mountain Notch to the Connecticut River—40 miles. The contract in substance is as follows: Messrs. Fuller & Harding are to complete the road for $2,300,000; one-half is to be paid in cash, and one-half in the bonds of the road. The sum of $270,000 is reserved for land damages, fencing, stations, water-tanks, engine-houses, turn-tables and equipments, to be built at either's option. The road is to be constructed as thoroughly as the present portion from Portland to North Conway, 60 miles. The rails are to be equal in quality to those of the Portland Rolling Mill. Messrs. Fuller & Harding constructed the road from Portland to North Conway.

It is now intended to build a new road from Swanton, the western terminus of the Portland & Ogdensburg road to Montreal, with a branch to Ogdensburg, going through Canada between the present Lake Champlain & Ogdensburg road and the St. Lawrence River. A new bridge is to cross the St. Lawrence at the Rapids.

Boston, Hartford & Erie.

The ferry property purchased for this company in 1868, in Newburgh, of Mr. Homer Ramsdell, for $410,-000, together with other property on the opposite side of the Hudson, was sold under foreclosure on the 3d inst. for $125,000.

Keystone Coal Company's Railroad.

The Keystone Coal Company, whose coal lands are in Somerset County, Pa., about three miles south of Myers' Mills, has decided to construct a narrow-gauge railroad, about five miles long, from the mines to a junction with the Pittsburgh & Connellsville Railroad, about two miles east of Myers' Mills. The cars will be loaded in the mine and dumped into the hopper cars of the Connellsville road at the other end of the line. It is hoped to have the road completed this season.

Bell's Creek Railroad.

The construction of this railroad, which is to extend from Bell's Mills, near Altoona, Pa., up Bell's Creek ravine to the great coal bed at the top of the Allegheny, a

distance of nine miles, is begun. It is to be of 3-feet gauge, intended entirely as a coal road. The cars will enter and be loaded in the mine.

Long Island Railroads.

The Central Railroad (A. T. Stewart's) has now 14 miles of track completed from Flushing eastward, and a large force is laying track and another grading. Several iron bridges also have been completed recently. The route is altered so as to cross the Long Island Railroad about two miles west of Farmingdale, and a survey has been made for a branch to Glen Cove, to diverge from the point where it crosses the Jamaica and Jericho turnpike. The road is to be opened for travel in July.

The extension of the Flushing & North Side Railroad makes good progress.

The Rockaway Branch of the Long Island Railroad is completed to Rockaway Village, and grading is in progress from Ocean Point westward.

The Rockaway Branch of the South Side Railroad is also progressing along the beach toward the Seaside House.

Grading is begun on the Newtown & Flushing Branch of the Long Island Railroad.

Engineers are making surveys for a proposed extension of the South Side Railroad to Moriches.

The extension of the Northport & Port Jefferson Branch of the Long Island Railroad is to be completed by July.

Baltimore & Ohio.

The company has recently imported from England Bessemer rails sufficient to lay forty miles of track, to be used in renewals.

Atlantic & Great Western.

The treasurer advertises that on and after May 20 the company will be prepared to issue its new first and second-mortgage bonds in exchange for Messrs. Duncan, Sherman & Co.'s certificates of similar bonds of the old company, deposited with them under the official scheme of reorganization, dated May 18, 1870.

Southern Ohio.

The Chesapeake & Ohio Company has set a corps of engineers to work on a final survey of this proposed road between Huntington and Dayton, O., and the prospect for the construction of the line within two years is considered favorable.

Illinois Farmers' Railroad.

It is reported that the work will begin directly on a branch of this road, now in operation from Jacksonville southwest to Virden, from a point near Waverly nearly due south through Scottville and Barr's to Alton Junction.

Plymouth, Kankakee & Pacific.

For the present work is suspended on this road, but it is expected that it will be resumed after the annual election next month.

Decatur & State Line.

On the 7th inst. the contract for the grading, grubbing, clearing and rock work of sections 99 to 128 of this road (from the Kankakee River southward) was awarded to the firm of Durley & Nicholl, of Hennepin, Ill. Of this firm Mr. Jonathan Durley is an old resident of Hennepin, well known in that part of the State, and Mr. T. J. Nicholl is an enterprising young engineer, who has been in charge of the work on the Plymouth, Kankakee & Pacific Railway in Hennepin County.

Burlington & Missouri River of Nebraska.

This company's sales of lands in Nebraska during April were 10,206 acres, for $31,775.

Cairo & Fulton.

This company is about to send locomotives and cars up the White River to Jacksonport, Ark., for use on the Arkansas section of the road.

Lynchburg & Danville.

At the recent directors' meeting in Alexandria the financial condition of the company and the progress of construction were reported to be satisfactory. A contract for laying the track was let to Adams, Hamner & Co. A conference was held regarding the proposed consolidation with the Orange, Alexandria & Manassas Railroad Company, which was recentiy authorized by the Virginia Legislature.

Charlotte, Augusta & Columbia.

The Richmond *Dispatch* says: "A meeting of the stockholders of the road was held at Charlotte, N. C., recently. A majority of the stock not being represented no business was transacted. The present officers hold over. Mr. Newcomer, of Baltimore, representative of the Pennsylvania combination, which owns or controls a majority of the stock, was in town, but kept aloof from the meeting."

North & South of Georgia.

This narrow-gauge company has a very little track laid from Columbus northward and a construction train running. It expects to lay five miles of track monthly hereafter.

Carondelet Bridge.

The telegraph reports that the St. Clair & Carondelet Bridge Company have contracted with a Connecticut firm for the construction of a bridge across the Mississippi River at South St. Louis, to be completed in two years, at a cost of about four millions dollars. It is to be a double-track railroad and carriage-way bridge.

This bridge is to be only six or seven miles south of the great Illinois & St. Louis Bridge, and it is expected that at least all the railroads entering St. Louis from the district south of the Missouri will use the Carondelet bridge, as they complain of a want of facilities for reaching the river in St. Louis, and have agreed to establish transfer stations, etc., in Carondelet.

Piqua & Northwestern.

This Ohio company proposes to construct a railroad from Piqua (where it will connect with the proposed Dayton, Piqua & Toledo road) through Berlin, Minster, Bremen and St. Mary's to Delphos, O., following the line of the Miami & Erie Canal. Hon. J. F. McKinney is President; W. J. Jackson, Vice-President and Chief Engineer, and Henry Flesh, Secretary. Sufficient stock subscriptions have been made and a survey is begun. The Toledo, Delphos & Indianapolis road will give it a Toledo outlet.

Dayton, Piqua & Toledo.

Under this name a company has been incorporated in Ohio to build a railroad from Dayton northward up the Stillwater Valley through the towns of Harrisburg, Union, Milton and Newtown to Piqua. The capital stock is fixed at $750,000 in shares of $50 each. The incorporators are J. F. McKinney, Henry Flesh, A G. Conover and Richard Slausson, of Piqua; Adam Pritz, Simon Gebhart and Dennis Dwyer, of Dayton; J. K. Teeter, of Newton; D. M. Cortes, of Milton; Jacob Stockslager, of Union; and R. M. Shoemaker, President of the Shore Line road.

Georgia Railroad Bonds.

The Atlanta *Constitution*, announcing the return of the Georgia Board Registration Committee from New York, says "the illegality of the Brunswick & Albany Railroad bonds was clearly proven;" and that the $300,000 bonds of the South Georgia & Florida Railroad, running from Albany to Thomasville, were shown to be legal.

Erie & Niagara.

Concerning the taking of this road from the Great Western of Canada and its union with the Canada Southern, the Toronto *Leader* says:

"The importance of the union between these two railways to the public and this city is imperfectly understood. The sudden expulsion of the Great Western on the expiry of its tenancy of the Erie & Niagara showed that it possessed peculiar value of some kind.

"The Canada Southern, from its grade and alignments over its line from Chicago, is the only railway that can carry grain in successful competition with water. Niagara will become in their hands a great port for large shipments of grain to Kingston and Oswego.

"It is the intention of Mr. William A. Thomson, under a company organization, to have two extensive iron steamers, of great speed and elegance, constructed on the Clyde, to make three trips each daily between Toronto and Niagara in the spring of 1873, and it is expected that the Erie and New York Central will use these vessels harmoniously with the Canada Southern and Erie & Niagara.

"Travelers will, by taking one of these steamers at Toronto for Niagara, be able to enter a railway carriage at the latter town, from which another agreeable route will be afforded to Chicago and the West."

New York & Chicago Air Line.

Articles of incorporation of this company were filed in the office of the Secretary of State of Indiana, at Indianapolis, May 10. The capital stock of this company is placed at $4,000,000. Until the annual election, the following stockholders constitute the Board: A. Taylor, T. Snell, J. Aiken, J. C. Prescott, J. F. Snell, L. A. Hall, most of whom are well-known heavy railroad contractors. The road in Indiana begins at the section of dividing line between the States of Indiana and Illinois, Lake County, and passes eastward through the counties of Lake, Porter, Laporte, St. Joseph, Elkhart, Lagrange, Steuben and De Kalb, to a point where the dividing line between the counties of Steuben and De Kalb strikes the dividing line between the States of Indiana and Ohio, a distance of about 150 miles.

Pacific of Missouri.

This company offers $500,000 out of $800 000 of 8 per cent. bonds, secured by a mortgage on property owned by the city of St. Louis, whose value is estimated at $1,500,000.

Decatur, Sullivan & Mattoon.

This company, whose road is mostly completed, has been consolidated with the Chicago & Illinois Southern Railroad Company, under the name of the latter, which proposes to complete the road to Decatur, Ill., and extend it from Mattoon southeastward through or near Prairie City, Newton, Olney and Albion, Ill., cross the Wabash at Grayville, and extend thence to Mount Vernon, Ind., on the Ohio. Lawrence, Tuttle & Co., of Springfield, Ill., have taken a contract for building part of the road.

New York, West Shore & Chicago.

The New York *Journal of Commerce* says: "The condition of the company, as near as has been ascertained, is as follows: The West Shore Hudson River Railroad Company is under the management of Mr. Allan Hay, President, and a board of directors, composed of John Van Ness, C. D. Van Wagenen, T. J. S. Flint and ten others. The company has not been successful, and the bonds have no market value at this time. Sales have been made recently at prices ranging from 22 to 10 cents on the dollar. The New York, West Shore & Chicago Railway Company, Mr. J. M. Courtenay, Chicago, President, has agreed with the first-named company to take up its bonds at the rate of 50 cents on the dollar on or before the 26th day of January, 1873, and to give in exchange bonds of $1,000 of the New York, West Shore & Chicago Railway Company, secured by its first mortgage or cash. Mr. Courtenay has appointed Messrs. C. D. Van Wagenen, John Van Ness and Allan Hay trustees to receive the bonds of the West Shore Hudson River Railroad Company on the above terms. The office of the trustees is at No. 33 Broad street, New York."

New York Central & Hudson River.

The following is the last report as to the payment by this company of the tax on its scrip dividend:

"The Collector of Internal Revenue, at Buffalo, N. Y., who was recently ordered by Commissioner Douglass to make legal demand on the New York Central Railroad Company for the payment of the special tax on its scrip dividend made in 1869, originally amounting to $1,250,000, but reduced by the courts to $460,720, and, if payment was not made, to levy on the property of the corporation, has replied that he is unable to find any property which belonged to any such corporation on the 1st of March, 1870, when the tax became due. This tax accrued prior to December 31, 1869, but was not payable, and therefore the Government had no lien upon it until March 1, 1870. It now appears that the New York Central Railroad Company was consolidated with the Hudson River Railroad Company in November, 1869, and the officers of the new company assert that, by that consolidation, both companies existing before that time became extinct. As soon as he receives a final report from the Collector, Commissioner Douglass will institute an investigation to ascertain the nature of this so-called consolidation, whether it was a lease or the formation of a new company. If it was the former, the Government still has a lien upon the property of the road. If it was the latter, some provision was probably made for the settlement of claims against each company, which might be presented after both were merged in the new corporation."

If a consolidation releases the parties to it from the payment of their debts, we might name a few hundred companies which might save a few millions by consolidating.

Iowa Eastern.

This company expects to have its road (narrow-gauge) completed in a very few weeks from McGregor southwest to Elkader, about 20 miles.

Missouri, Kansas & Texas.

Two passenger trains daily now run between St. Louis and the southern terminus of this road in the Indian Territory, where daily lines of stages connect it with the northern terminus of the Houston & Texas Central Railroad.

Boston & Albany.

The Springfield *Republican* reports: "The office of head freight conductor on the Boston & Albany road has been abolished, and train dispatchers have been appointed at the principal points along the line instead. E. Biggins, formerly in charge of the trains between this city and Pittsfield, has been appointed one of the dispatchers and stationed at Hinsdale, and trains hereafter will be "made up" at the latter place instead of Pittsfield. Edward Sackett has been appointed yard-master at West Springfield."

Buffalo & Jamestown.

Three towns on this proposed railroad have subscribed $285,000 in aid of it, and another is expected to subscribe $50,000. Engineers are making surveys of the different routes proposed.

Houghton & Ontonagon.

This railroad in the Upper Peninsula of Michigan is now nearly completed from the western terminus at L'Anse southeast ten miles, and the whole line to Lake Michigamme is cut and cleared and ready for grading, which will be begun directly. It is hoped that it will be completed by November.

Grand Trunk Railway.

This company has just completed a fine iron ferry steamer to be used in conveying cars across the St. Clair River between Port Huron and Port Sarnia.

Springfield & St. Louis.

A correspondent of the St. Louis *Republican* reports that S. H. Melvin and George Black, of Springfield, who went to the East recently in the interest of this road, have returned and reported that they have made all the arrangements necessary to secure capital for the construction of the road.

San Joaquin Valley.

This branch of the Central Pacific was completed on the 24th ult. for 16 miles south of the crossing of the San Joaquin.

Chicago, Dubuque & Minnesota.

This railroad was completed to Lansing, Iowa, 83 miles north of Dubuque, on the 1st inst.

St. Louis & Keokuk.

A quantity of iron for this road has been received and track-laying is progressing from Hannibal southward. The grading is completed for about 16 miles.

Maquoketa Valley.

Articles of incorporation of this new Iowa company have been recorded. They provide that the capital stock of the road shall be $1,000,000, to be divided into shares of $100 each, the corporation to continue fifty years from date of adoption of articles. The route of the proposed line may start from some point on the Iowa Division of the Northwestern road commonly known as the Midland, at or near Baldwin Station in Jackson County, or from some point on the Sabula, Ackley & Dakota road between Lost Nation and Delmar Junction, on said road; or from some point on the Davenport & St. Paul road, to form connection with said road near Maquoketa in Jackson County, and run thence northward to the State line of Minnesota, or to the Mississippi, to be built *via* Canton, Cascade and Dyersville to Colesburg.

Mackinaw & Chicago.

This company was organized May 1 to construct the proposed line from Monteith, Mich., on the Grand Rapids & Indiana Railroad 16 miles north of Kalamazoo, southwest to the Pittsburgh, Fort Wayne & Chicago Railway at or near Valparaiso. In connection with the Fort Wayne and the Grand Rapids roads it would form a pretty direct line from Chicago to Mackinaw. The directors are Hon. Henry Chamberlain, of Three Oaks; Alonzo Sherwood, of Weesaw; George H. Murdock, of Berrien; Wm. Smyth Farmer, of Pipestown; Charles Duncan, of Keeler; John B. Potter, of Lawrence; Lucius B. Kendall, of Kalamazoo; James M. Ballou, of Otsego; and S. R. Hughes, of St. Joseph, Mich. Officers: S. R. Hughes, President; Charles Duncan, Vice-President; Henry Chamberlain, Treasurer; Lucius B. Kendall, Secretary.

Lake Superior & Mississippi.

The following circular, dated May 8, from C. W. Mead, General Manager of the Northern Pacific Railroad, an-

nounces the assumption of this road by his company under the recent lease:

"The Northern Pacific Railroad Company having assumed control of the Lake Superior & Mississippi Railroad, together with its leased lines, consisting of the Stillwater & St. Paul, Minneapolis & Duluth railroads, and Minneapolis & St. Louis Railway, these roads will embrace and be hereafter called the Lake Superior & Mississippi Division of the Northern Pacific Railroad.

"W. W. Hungerford is appointed Superintendent of this division, with headquarters at St. Paul."

Attica & Terre Haute.

The railroad men interested met at Covington, Ind., May 8, and took final action in the matter of consolidating the Attica & Terre Haute Railroad with the Chicago, Danville & Vincennes Railroad. The consolidated company adopted the name of the latter, and elected for Directors James W. Elwell, James D. Fish, Amos Tenney, Matthew Taylor, New York; N. F. Merrill, John Tenney, George Nebeker and Alvin Gilbert. William D. Judson was made President of the new company.

Ware River Railroad.

The Vermont Central, hereafter, it is reported, will control this new Massachusetts railroad, which is virtually a branch of the New London Northern, and complete it at once. The completed portion of the Ware River road extends from Palmer northeast about 15 miles to Gilbertville, and most of the work is done on the road-bed of the remainder, from Gilbertville northward to Winchendon, about 30 miles. It is reported that the road from Winchendon northward to Peterboro, N. H., will be combined with this, a new line built from Peterboro north to Hillsboro Bridge, the southern terminus of the Contoocook Railroad, and thus a line completed from Concord to New London.

Ohio & Kentucky.

The stockholders of this new Ohio company held a meeting May 7 at Chillicothe, O., for the election of thirteen directors. The stockholders in Fairfield County, which is entitled to two directors, name Messrs. Thomas Ewing, Jr., and Charles Boreland, of Lancaster. The length of the proposed route will be about 104 miles, and the substructure, grading, ties, bridging, ready for the iron, is estimated at $7,000 per mile. The route, commencing at Lancaster, is southwest through Pickaway, Ross, Highland, Pike, Adams and Brown counties, connecting at Aberdeen with the Maysville & Paris Railroad.

Cairo & Fulton.

Mr. Thomas Allen, the President, has let the contract for the erection of bridges on this road, over the White River, Black River and Little Red River, to the Baltimore Bridge Company, of which Mr. C. Shaler Smith is the President. Mr. Allen has also let out to contractors 45 miles of the Cairo & Fulton road south of Little Rock, running from that place to Rockport, near the Hot Springs. This is to be constructed immediately, and the work will go on as rapidly as possible.

Rock Island Bridge.

The new railroad and wagon bridge across the Mississippi River, at Rock Island, was formally tested May 8, and is now in use for construction trains. After the completion of the Iowa embankment, the bridge will come into full use by the railroads; but the lower deck will not be opened to public travel until the bridge is taken off the hands of the contractors, which will not be long delayed.

New York & Boston.

A railroad company has been organized for the purpose of building and operating a railroad from the vicinity of Getty square, Yonkers, N. Y. to a point on the Van Cortlrnd Manor property, to connect with the New York & Boston Railroad now in the couse of construction along the Tibbet's Brook Valley.

Dayton Car Shops.

The large car-wheel foundry, 100 by 75 feet, of the Dayton car shops took fire at about half-past eight o'clock, May 13, and was destroyed. Loss, $15,000, without insurance.

Annual Meetings.

The Atchison, Topeka and Santa Fe Railroad Company, in Topeka, Kansas, May 30.

The Chicago & Northwestern, in Chicago, June 6.

The Chicago, Rock Island & Pacific, in Chicago, June 5.

The Columbus, Chicago & Indiana Central, in Columbus, June 5.

The Delaware & Raritan Canal Company, in Trenton, N. J., May 20.

The Illinois Central Railroad Company, in Chicago, May 29.

The Milwaukee & St. Paul, in Milwaukee, June 8.

The New York Central & Hudson River, in New York, June 5.

The New Jersey Railroad & Transportation Company, May 21.

The New York & Harlem Railroad Company, in New York, May 21.

The St. Louis, Jacksonville & Chicago, in Jacksonville, Ill., June 12.

The St. Louis, Alton & Terre Haute, in St. Louis, June 3.

The Texas Pacific, in New York, corner of Warren and West streets, May 20.

Atchison & Nebraska.

An officer of the company writes to us of this road and the country on its line as follows:

"We have 45 more miles of iron to lay before reaching Lincoln and connecting with the Burlington & Missouri River Railroad. Our grading will be finished May 15, and much of our track material is already here.

"This road is built with very easy grades and light curves through a farming country in no way inferior to that which furnishes the Chicago, Burlington & Quincy its heavy local business. Southern Nebraska is not equaled in richness; in Kansas there is much land as good as any here, but here there is none that is poor, the uplands producing as good crops as the bottoms. The timber which the country lacks is now supplied by rail.

"There is no large tract of government land to invite settlers, but—what true farmers prefer to cheap lands—good lands, farms in all stages of improvement, prosperous towns, abundant water-power, light taxation and facilities for shipping farm produce without breaking bulk to St. Louis and Chicago markets. Excellent unimproved farms can now be bought at from five to eight dollars an acre. Southern Nebraska is mainly settled by people from the Northern and Eastern States, who came with means to improve their farms, erect buildings, bridge the streams, build mills and make themselves homes.

"Such people will still find Southern Nebraska that district where, of all the West, farming can be carried on most profitably, with the further advantages of settled society, good schools and good neighbors. Excuse my saying so much; but one who knows well its beauties and attractions, naturally grows warm at the thought that emigration has poured into marshes, spread over barrens, and starved on "homestead areas," while a country which will justify any praise has been passed by. Fortunately and unfortunately, Nebraska has not had the political notoriety of her sister State: life and property have been, and are, safe; had it been otherwise the State would be as well settled to-day as it is sure to be in five years.

"This railway is well but economically built, and is equipped uniformly with the other "Joy" roads. The construction of a West Branch from Table Rock (84 miles from Atchison) through the southern tier of Nebraska counties has been commenced, and there is some probability of a road (the Nebraska Trunk Railroad) being built from Rulo (46 miles from Atchison) *via* Brownville, Nebraska City and Plattsmouth to Omaha.

"Sooner or later the Atchison & Nebraska will become of necessity a trunk line. Construction is being pushed rapidly, and it is expected that through trains between St. Louis and Fort Kearney will commence running *via* Missouri Pacific Railroad, Burlington & Missouri River in Nebraska, and Atchison & Nebraska Railroad, in July next, with the advantage of about 80 miles in distance over the present route *via* Omaha, and the further recommendation of avoiding all crossing of the Missouri River."

Louisville, New Albany & St. Louis.

This company is constructing a tunnel about five miles west of New Albany, which will be 4,328 feet long, through hard sandstone. Work is going on from six headings, there being two shafts, and at the end of April 3,446 feet had been excavated, leaving 882 feet, which it is believed will be completed about the middle of June. The grading is well under way, and it is intended to have the entire road completed in November.

Hannibal & St. Joseph.

The trustees advertise for proposals for the sale to them of $50,000 of the company's land bonds. The proposals will be opened at the office of the trustees in Boston, May 22.

Central of Georgia.

Mr. Virgil Powers, Chief Engineer of this railroad, is making surveys for a proposed new connection of this road with Louisville.

Iowa Pacific.

At a meeting of the newly organized board in Dubuque on the 11th, an assessment of 10 per cent. on the capital stock to be paid during the month. J. A. Rhomberg, of Dubuque, was appointed Superintendent of Construction.

Route of the Canadian Pacific Railroad.

The report of Mr. Sanford Fleming on the Pacific Railway exploration survey has been laid before the New Dominion Parliament. It states that a point opposite Lake Nipissing, named Mattawa, was selected as the eastern end of the survey. This point, it is claimed, is easily connected by projected local lines. The Pacific terminus is undetermined, the line of route through British Columbia being still a matter of uncertainty. The physical features of the country naturally divide the survey into three great divisions, as follows: 1st, from Mattawa to Fort Garry; 2d, from Fort Garry to the Rocky Mountains; 3d, from the Rocky Mountains to the Pacific coast. The distance from Mattawa to Fort Garry was subdivided into eleven different surveys of 75 to 90 miles in length. The country is densely wooded, and the survey was therefore unusually difficult. A branch surveying party explored the country from Nipissing to Sault Ste. Marie, to connect with lines south of Lake Superior, or steamboat navigation. Another expedition was sent north to James Bay. West of Fort Garry, owing to the well-known and very simple features of the country, a continuous instrumental survey was not thought necessary. The number of rivers in this region, flowing through deep and wide beds, are said to be suggestive of bridging on a gigantic scale. A double expedition was organized to proceed westward of Fort Garry, and to penetrate the Howse Pass and Yellow Head Pass of the Rocky Mountains. One of these passes, it is believed, would be the most eligible for a railway. The obstacles to railway construction in British Columbia are represented as most serious.

With respect to the British Columbia survey, the report says: Some hopes are entertained that a line may be found from the North Thompson across the Selkirk Range to the Quesnel Lakes, and thence *via* Quesnel to Bute Inlet; but should this fail, a careful examination will be made about 50 miles further to the south, on a line projected through Horse Lake and Lake La Hoche. Should all these prove fruitless it is confidently believed that it will be quite possible to reach Bute Inlet by a practical line from Tete Jaune Cache, going round the Cariboo country on the north side, along the banks of the Fraser River, and thence across the Chilcotia Plains. The only objection to the latter route would be its length. The gradients can scarcely fail to be favorable on account of the line following the river for over 250 miles on an uniform and gradual descent. The harbors spoken of as accessible from the Pacific for the terminus are Burrard's Inlet, Esquimault, Albemi (at the head of Barclay Sound), a harbor on Nootka Sound, Bentinck Arm and Port Essington. A map accompanies the report, and also a diagram, showing the levels at which the proposed line will run, in comparison with the Union Pacific. From this it appears that the latter runs for 1,306 miles at a higher level than the Yellow Head Pass, and that this point, the highest summit traversed by the Canadian Pacific Railway line, is less than half the elevation attained at several points on the line now being constructed across the continent. An approximate estimate of the length of the line is formed, and it is calculated that the distance of the Canadian Pacific between Montreal and Fort Garry is 1,180 miles, while the line by Sault Ste. Marie and Pembina is 1,440, and by Chicago and St. Paul 1,843 miles. From Toronto the distance to Fort Garry would be 1,110 miles, or *via* Sault Ste. Marie the distance is 1,290 miles, and by Chicago 1,507 miles. The distance *via* the Union Pacific Railway from New York to San Francisco is 3,363 miles, and from New Westminster to Montreal only 2,730 miles. The Canadian Pacific Railway, it is asserted, would, even from New York, Boston or Portland, offer an advantage in distance from 300 to 500 miles, as compared with the Union Pacific. The Canada route will shorten the distance between Liverpool and China more than a thousand miles.

Report of the Milwaukee & St. Paul Railway Company.

From the eighth annual report, covering the year 1871, we make the following extracts:

The company owns the following lines of railroad:

Milwaukee to St. Paul, *via* Prairie du Chien	405 miles.
" to La Crosse, *via* Watertown	196 "
" to Portage, *via* Horicon	95 "
Horicon to Berlin and Winneconne	58 "
Watertown to Madison	37 "
Milton to Monroe	42 "
Calmar to Algona	126 "
Conover to Decorah	10 "
Austin to Mason City	40 "
Mendota to Minneapolis	9 "
Total	1,018 miles.

In addition to the above 1,018 miles of railroad the company own $2,001,000 of the capital stock of the Western Union Railroad Company, being a majority of the capital stock of that company.

The Milwaukee & St. Paul Railway Company now operate, by lease, the following roads:

The Oshkosh & Mississippi River Railroad (from Ripon to Oshkosh) twenty miles, commencing January 1, 1872, paying as a rental therefor 35 per cent. of the gross earnings.

The Hastings & Dakota Railroad, now in operation from Hastings to Carver, forty-eight miles, but under contract to be finished to Glencoe by July 1, 1872, making seventy-five miles in all, paying as rent therefor $1,500 per mile per annum of finished road.

The Milwaukee & St. Paul Railway Company have, since January 1, 1872, but as of that date, purchased from the Chicago & St. Paul Railroad Company the line of road extending from St. Paul to Winona and La Crescent. It is in operation from St. Paul to Winona, 103 miles, and is to be completed from Winona to La Crescent, about 30 miles, previous to October 1, 1872. The purchase was made by giving their bonds to the amount of £800,000, payable in London in A. D. 1902, at 7 per cent. interest.

The cost of the 1,018 miles, including equipment and supplies, was as follows:

Mortgage bonds	$18,130.500
Preferred stock	10 825.100
Common stock	11,823.500
Total	$40.779,100
Less cost of Western Union	1,500,000
Cost of 1.018 miles	$39.279,100

or $38,580 per mile, against $37,850 per mile, which was the cost the previous year.

The comparative earnings, expenses and general condition of the company are as follows:

	1870.	1871.		
Gross earnings	$7.421.061	$6.690,696	Dec.	$730.365
Operating expenses	4 653.274	3.850.355	Dec.	802,919
Net earnings	2 767.787	2.840.341	Inc.	72,554
Interest on bonds	1.251.310	1.317.735	Inc.	66,425
Cost of road	33.530.731	39.278.965	Inc.	748,234
Tons freight moved	1,522.753	1.463,156	Dec.	59,597
No of passengess	810.060	849.631	Inc.	39,571
Gross earnings per mile	$7.674	$6.572	Dec.	$1,102
Miles of railroad	1.018	1,018		
Miles run by trains	3,335.056	3 319.203	Dec.	15 853
Cost per mile run	$1 40	$1 16	Dec.	24 cents.

It will be observed that there is a decrease in the gross earnings of $730,365, owing to a comparatively light wheat crop and the reduced rates for the transportation of freight and passengers. There was a decrease of 81,073 tons of eastward bound freights, and an increase of 21,475 tons of western bound freights.

The average price received per ton per mile for a series of years has been

For 1865	3.41 cts.	For 1868	3.49 cts.
1866	3.76 cts.	1869	3.10 cts.
1867	3.94 cts.	1870	2 82 cts.
1871	2.54 cts		

The company earned 7 per cent. net on their preferred stock, and a fraction over 6 per cent. on their common stock. They paid the 7 per cent. in cash to the preferred stockholders, and deferred the dividend on the common stock, having used the remainder of the net earnings for improving and acquiring additional property.

The expenditures made by the company during 1871, not charged to operating account, amount to $717,012.82, all of which the directors believe to be either absolutely necessary or very desirable to be made for the benefit of the company.

The General Manager's report gives the following detailed statement of earnings and expenses:

EARNINGS.

	1870.	1871.	Increase.	Decrease.
From freight	$5,148,355 86	$4,444,568 11	....	$703,787 75
From passengers	1,735,153 91	1,698,469 28	....	36,684 63
From mails, express, etc.	537,551 66	547,658 17	$10,106 51	....
Total	$7,421,061 43	$6,690,695 56		$730,365 87

EXPENSES.

	1870.	1871.
Repairs of road	$817.052 67	$770,574 00
Repairs of rolling stock and machinery	836.958 48	657.583 47
Operating	2,363 815 29	2,096,872 79
Extraordinary	635.447 85	325,324 30
Total	$4,653.274 29	$3.850.354 56

The report by divisions shows the earnings of the La Crosse Division (233 miles) to have been $1,906,896.18, or $8,183 per mile; of the Northern Division (158 miles) $720.586.60, or $4.710 per mile; of the Prairie du Chien Division (236 miles) $2,139,-116.75, or $9,063 per mile; and of the Iowa & Minnesota and Iowa & Dakota divisions (396 miles) $1,924,096.03, or $4,860 per mile.

The proportion of operating expenses, which for the entire system is 57½ per cent., on these several divisions is as follows: La Crosse Division, 56¾ per cent.; Northern Division, 61 per cent.; Prairie du Chien Division, 53 per cent.; Iowa & Minnesota and Iowa & Dakota Divisions, 61 per cent.

The company's equipment at the close of the year included 155 locomotives, 81 first-class and 11 second-class passenger cars, 11 sleeping cars, 62 baggage, mail and express cars, 2,470 box, freight and caboose cars, and 590 flat and stock cars.